



Powerware

**Eaton® Power Distribution Rack (PDR)
208V
User's Guide**

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Class A EMC Statements

FCC Part 15

NOTE This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

ICES-003

This Class A Interference Causing Equipment meets all requirements of the Canadian Interference Causing Equipment Regulations ICES-003.

Cet appareil numérique de classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada, ICES-003.

Requesting a Declaration of Conformity

Units that are labeled with a CE mark comply with the following harmonized standards and EU directives:

- Harmonized Standards: IEC 61000-3-12, IEC 60950-1:2001
- EU Directives: 2006/95/EC, Council Directive on equipment designed for use within certain voltage limits
2004/108/EC, Council Directive relating to electromagnetic compatibility

The EC Declaration of Conformity is available upon request for products with a CE mark. For copies of the EC Declaration of Conformity, contact:

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Special Symbols

The following are examples of symbols used on the product to alert you to important information:



RISK OF ELECTRIC SHOCK - Observe the warning associated with the risk of electric shock symbol.



CAUTION: REFER TO OPERATOR'S MANUAL - Refer to your operator's manual for additional information, such as important operating and maintenance instructions.



This symbol indicates that you should not discard the product in the trash. This product must be disposed of properly. For more information, contact your local recycling/reuse or hazardous waste center.



This symbol indicates that you should not discard waste electrical or electronic equipment (WEEE) in the trash. For proper disposal, contact your local recycling/reuse or hazardous waste center.

Table of Contents

1	Introduction	1
2	Safety Warnings	5
3	Installation	7
	Inspecting the Equipment	7
	Tools Required	7
	Planning the Cabinet Location	8
	Unpacking the Cabinet	9
	Checking the Accessory Kit	10
	Preparing the Cabinet	10
	Moving the Cabinet to its Final Location	10
	Installing the PDR	12
	Removing the Solid Side Panel	12
	Removing the Side Panel with Breakers	13
	Removing the Exterior Doors and Interior Barriers	16
	Wiring Input and Output Power	18
	Initial Startup	32
	Replacing the Interior Barriers, Exterior Doors, and Side Panels	33
	Completing the Installation Checklist	34
4	Operation	35
	Control Panel Functions	35
	EMS Meter Levels	36
	Display Functions	36
	Menu Map	37
	Setup Options	38
	Surge Protection Option	38
	Initial Configuration	39
	EMS System Level Monitoring	39
	EMS Branch Circuit Monitoring System	39
	Side Breaker Access	39
	Startup and Shutdown	40
	Startup	40
	Shutdown	40
5	Maintenance	41
	Important Safety Instructions	41
	Preventive Maintenance	41
	DAILY Maintenance	41
	PERIODIC Maintenance	41
	ANNUAL Maintenance	41
	Updating the Firmware	42
	Short Circuits	42
	Storage	42
	Recycling the Used PDR	42

6	Specifications	43
	Product Specifications	43
	Configuration Schematics	45
7	Troubleshooting	47
	Alarms and Conditions	47
	Service and Support	47
8	Warranty	49

Chapter 1

Introduction

The Eaton® Power Distribution Rack (PDR), part of the Powerware® series, is designed to provide increased distribution capacity in a standard data center enclosure that can be placed anywhere within or at the end of the aisle, depending on configuration. Providing outstanding performance and reliability, the PDR's unique benefits include the following:

- 208/120V, 50 Hz or 60 Hz three-phase power distribution unit, with one to four panelboards, delivering up to 168 branch breakers
- Single-feed or dual-feed voltage sources (400A, 600A, 800A)
- Standard top and bottom cable entry in a free-standing structure
- Easy installation and servicing with front and rear access, spacious wireways, and removable side panels, exterior doors, and interior barriers
- Conduit entry plates with plugged holes instead of knockouts
- Display viewable through the front exterior door for ease of use
- Lockable exterior doors and secure interior barriers accessible only by tool
- Firmware that is field upgradeable
- Separate isolated neutral busbar for each panelboard to connect the output cable neutral conductor, in addition to a separate ground busbar that may be configured for an isolated ground system
- Energy Management System (EMS) monitoring with single or dual displays.

EMS provides two levels of configuration and metering: System Level Monitoring and Branch Circuit Monitoring System (BCMS). With BCMS, you can see the current values of each of the distribution branch breakers, letting you measure, plan, and manage power with greater precision.

EMS also provides communication options such as network connectivity. The Power Xpert® Gateway Card installed in the X-Slot® communication bay provides remote monitoring through a Web browser interface, e-mail, and a network management system using SNMP; connects to a twisted-pair Ethernet (10/100BaseT) network. Modbus® TCP support provides direct integration of the PDR's parameters to a Building Management System (BMS). It has a built-in switching hub that allows one additional network device to be connected to the network without the requirement of an additional network drop.



NOTE LAN drops for use with the X-Slot card must be provided by the customer.

The following options for the PDR are available:

- Choice of input connection:

Configuration	Input Connection	Aisle Location
Quad-Feed Input	Direct connection to each panelboard breaker for one-, two-, three-, or four-input feed	Anywhere in aisle
Single 800A Main Input Lug	Connection into a main lug (up to 800A) mounted behind panelboard	Anywhere in aisle
Dual 800A Main Input Lug	Connection into dual main lugs (up to 800A) mounted behind panelboards on front and rear	Anywhere in aisle
Single 400A Main Input Breaker	Connection to a single 400A main breaker mounted on the side of the cabinet	End of aisle only
Dual 400A Main Input Breaker	Connection to dual 400A main breakers mounted on the side of the cabinet	End of aisle only
Single 600A Main Input Breaker	Connection to a single 600A main breaker mounted on the side of the cabinet	End of aisle only
Dual 600A Main Input Breaker	Connection to dual 600A main breakers mounted on the side of the cabinet	End of aisle only

- Three-phase panelboard options for front and/or rear:



NOTE For a single-feed input, the minimum PDR configuration is one panelboard on the front.

Model	Number of Panelboards per Side	Type of Panelboard	Number of Poles	Capacity	Panelboard Breaker Rating (Overall Short Circuit Rating)
PDR	1 or 2	Cutler-Hammer® column	42	320A	320A (10 kA)
	1 or 2	Cutler-Hammer column	42	225A	225A (10 kA)

- **Single 800A Main Input Lug, Dual 800A Main Input Lug, Single 400A Main Input Breaker, Dual 400A Main Input Breaker, Single 600A Main Input Breaker, and Dual 600A Main Input Breaker configurations.** Choice of calculated or measured neutral current
- Branch circuit breakers installed at the factory
- Surge protection with Transient Voltage Surge Suppression / Surge Protective Device (TVSS/SPD)
- Environmental Monitoring Probe (EMP) for monitoring ambient temperature and humidity. The EMP also provides contact states for two additional devices that are plugged into the EMP.
- Front exterior door options:
 - Perforated door
 - Glass door
 - Perforated door with a cutout for the display



NOTE The rear door is a perforated split door.

Figure 1 shows a PDR.

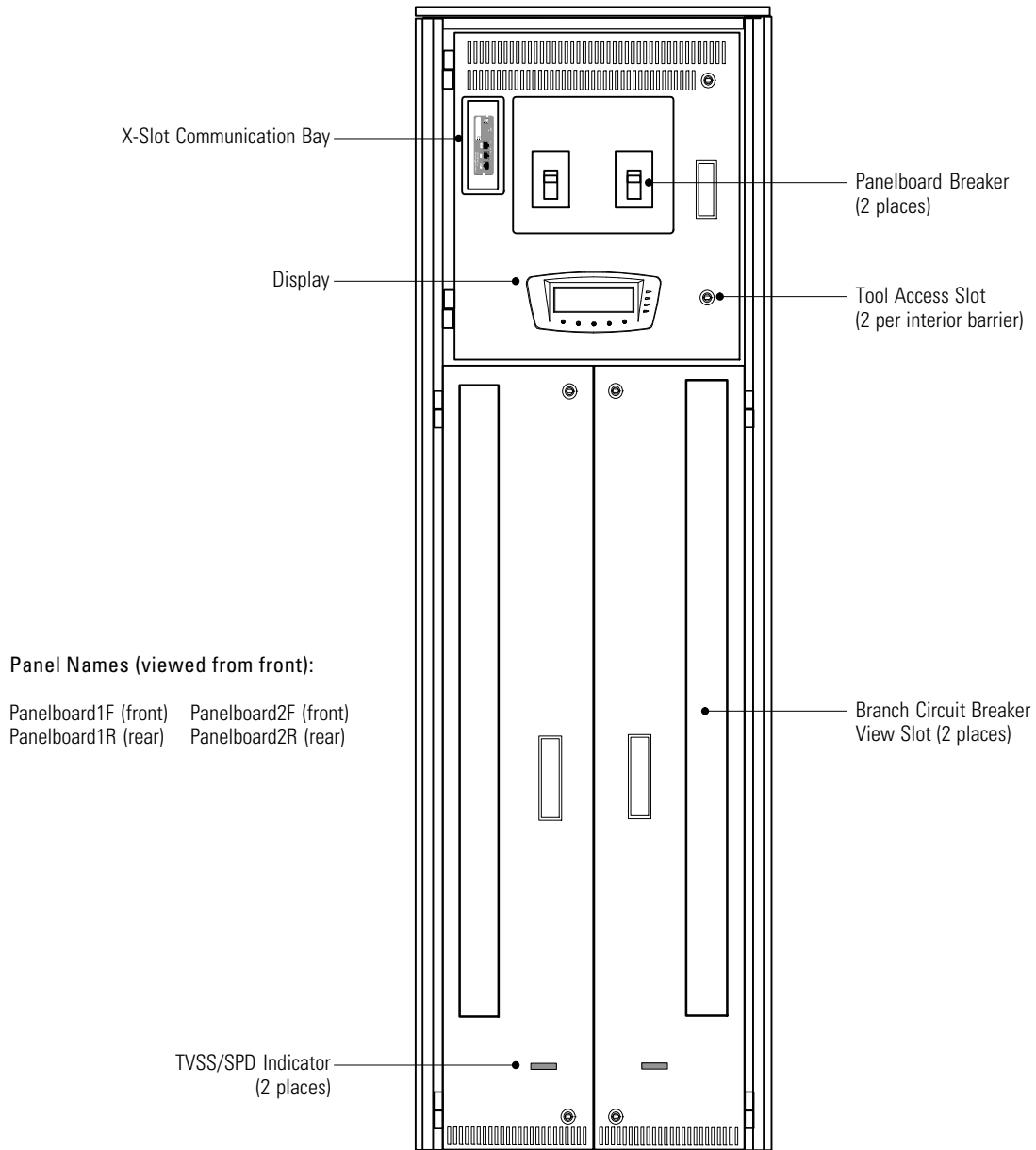


Figure 1. PDR (Exterior Door Not Shown)

IMPORTANT SAFETY INSTRUCTIONS SAVE THESE INSTRUCTIONS

- This manual contains important instructions that should be followed during installation and maintenance of the Power Distribution Rack (PDR). Please read all instructions before operating the equipment and save this manual for future reference.
- The PDR is designed for industrial or computer room applications, and contains safety shields (interior barriers) behind the doors. The PDR system is a sophisticated power system and should be handled with appropriate care.

DANGER



The PDR contains **LETHAL VOLTAGES**. All repairs and service should be performed by **AUTHORIZED SERVICE PERSONNEL ONLY**. There are **NO USER SERVICEABLE PARTS** inside the PDR.

WARNING



- To reduce the risk of fire or electric shock, install this PDR in a temperature and humidity controlled, indoor environment, free of conductive contaminants. Ambient temperature must not exceed 40°C (104°F). Do not operate near water or excessive humidity (95% maximum). The system is not intended for outdoor use.
- Ensure all power is disconnected before performing installation or service.

CAUTION



- Keep the PDR doors closed to ensure proper cooling airflow and to protect personnel from dangerous voltages inside the unit.
- Do not operate the PDR close to gas or electric heat sources.
- Locate the PDR on a concrete or other non-combustible surface only.
- The operating environment should be maintained within the parameters stated in this manual.
- Keep surroundings uncluttered, clean, and free from excess moisture.
- Use leveling feet only for distributing the weight of the cabinet equally. Using the leveling feet to raise the cabinet may result in serious injury to personnel or damage to the cabinet.
- Observe all DANGER, CAUTION, and WARNING notices affixed to the inside and outside of the equipment.

Chapter 3

Installation

This section explains:

- Equipment inspection
- Tools required
- Planning the cabinet location
- Unpacking the cabinet and checking the accessory kit
- Preparing and moving the cabinet to its final location
- Installation and wiring
- Initial startup
- Completing the installation checklist

Inspecting the Equipment

If any equipment has been damaged during shipment, keep the shipping cartons and packing materials for the carrier or place of purchase and file a claim for shipping damage. If you discover damage after acceptance, file a claim for concealed damage.

To file a claim for shipping damage or concealed damage: 1) File with the carrier within 15 days of receipt of the equipment; 2) Send a copy of the damage claim within 15 days to your service representative.

Tools Required

To assemble the components, the following tools may be needed:

- #1 and #2 slotted screwdrivers
- M10, M13, and 5/16" socket wrenches
- 14 mm socket and socket wrench
- 5/16" Allen wrench
- 3/4" and 1-1/8" open-end wrenches
- Step ladder, for ease of access to the top of the cabinet
- **Configurations with side breakers.** 10 mm socket and socket wrench
- **Quad-Feed Input, Single 800A Main Input Lug, and Dual 800A Main Input Lug configurations.** Crimping tools recommended in Table 2 on page 19.

Planning the Cabinet Location

Follow these guidelines for planning the cabinet’s final location:

- Place the cabinet on a concrete or other non-combustible surface in a protected area that has adequate airflow and is free of humidity, flammable gas, and corrosion.
- DO NOT place the cabinet on its side.

To plan the cabinet’s location:

1. Verify that the final location for the cabinet has the following clearances. Check your local codes and regulations for other recommended clearances.

Table 1. Cabinet Clearances

Cabinet Area	Clearance
Above	A minimum of 460 mm (18”) for the exit of cables and conduit and for ventilation
Below	A minimum of 150 mm (6”) for the exit of cables and conduit and for ventilation NOTE This clearance can be provided by a raised floor.
Front (single door)	910 mm (36”) for access
Rear (double doors)	Configurations with rear panelboards installed. 910 mm (36”) for access Configurations without rear panelboards installed. 455 mm (18”) for access
Sides	Configurations with side breakers. End of aisle installation only Configurations without side breakers. None required NOTE 38 mm (1.5”) allows the doors to open past 90° for easier access to front and rear breakers.

2. Verify that the cabinet does not exceed your floor loading capacity. See Table 9 on page 43 for cabinet weight and dimensions.
3. Verify that the location meets the environmental requirements listed in Table 13 on page 44.
4. Plan the cable routing and conduit access to the cabinet:
 - The top and bottom of the cabinet have swappable entry plates and removable plugs for cable connection. See Figure 2 on page 11.
 - Identify all conduit requirements and mark their location.
 - To avoid congestion and allow for future load increases, use the conduit openings closest to the center of the cabinet first.
 - **Bottom entry wiring.** To allow for proper bending radius and ease of installation, for ground and neutral connections use the conduit openings farthest from the connection.
 - Size conduit to accommodate one neutral conductor the same size as the phase conductor and one ground conductor. If two neutral conductors or an oversized neutral conductor are to be installed, size the conduit to accommodate the extra wire or size. All PDR products can accommodate a double-sized neutral.

Unpacking the Cabinet



CAUTION

- Only qualified personnel should be permitted to perform any work associated with this equipment.
- Unpacking the cabinet in a low-temperature environment may cause condensation to occur in and on the cabinet. Do not install the cabinet until the inside and outside of the cabinet are absolutely dry (risk of electric shock).
- The cabinet is heavy (see page 43). Removing the cabinet from its packaging requires a minimum of three people.
- Do not install a damaged cabinet. Report any damage to the carrier and contact your service representative immediately.

Do not remove protective packaging until the equipment is ready for installation.

To unpack the cabinet:

1. Carefully inspect the outer packaging for evidence of damage during transit.
2. Move the packaged cabinet as near as possible to its final location.
3. Remove the outer layer of shrinkwrap.
4. Remove the ramp packaged next to the cabinet and retain for later use to roll the cabinet off the pallet.
5. Remove the inner layer of shrinkwrap and the large cardboard corner posts.
6. Remove the large plastic bag covering the cabinet.
7. Remove the accessory kit box from beside the cabinet.

CAUTION



- The cabinet may roll when resting on its casters. Take proper care to secure the cabinet and ensure the safety of personnel.
- Do not stand on or in the cabinet. The cabinet may tip and cause serious injury. Do not work on or in the cabinet until the leveling feet are in place.

8. The cabinet is bolted to the pallet in four places with heavy-duty anchoring feet. Using care to verify that the cabinet does not roll on its casters, use a 14 mm socket and socket wrench to remove the anchoring hardware.
9. Verify that the installed leveling feet are retracted sufficiently to allow the cabinet to move easily.
10. Place the supplied ramp next to the pallet, inserting the two hooks on the top of the ramp into the holes near the top edge of the pallet. Verify the ramp is firmly and securely seated.
11. Carefully roll the cabinet off the pallet. Use three people to ensure the cabinet does not tip.
12. Discard or recycle the pallet and packaging in a responsible manner, or store them for future use.

Checking the Accessory Kit

Verify that the following items are included inside the accessory kit box:

- This user's guide
- (2) Door keys
- Breaker handle
- Arc flash hazard label
- **Configurations with side breakers.** (10) Panel keys

Quad-Feed Input, Single 800A Main Input Lug, and Dual 800A Main Input Lug configurations.

Verify that a separate package of the following items is included with the cabinet:

- **One side.** (12) Ring terminal lugs and nuts
- **Two sides.** (24) Ring terminal lugs and nuts

Preparing the Cabinet

To prepare the cabinet for installation:

1. Verify operation of the door handles:

To open a door, push in on the key lock. The handle pops up. Pull out on the handle.

To close a door, push in on the handle until it snaps into place.

2. Verify that the supplied keys lock and unlock the doors.

3. Place the breaker handle on one of the breakers.

Use the breaker handle to open and close the breakers during operation of the PDR. Remove the breaker handle as needed to open and close the exterior doors or interior barriers.

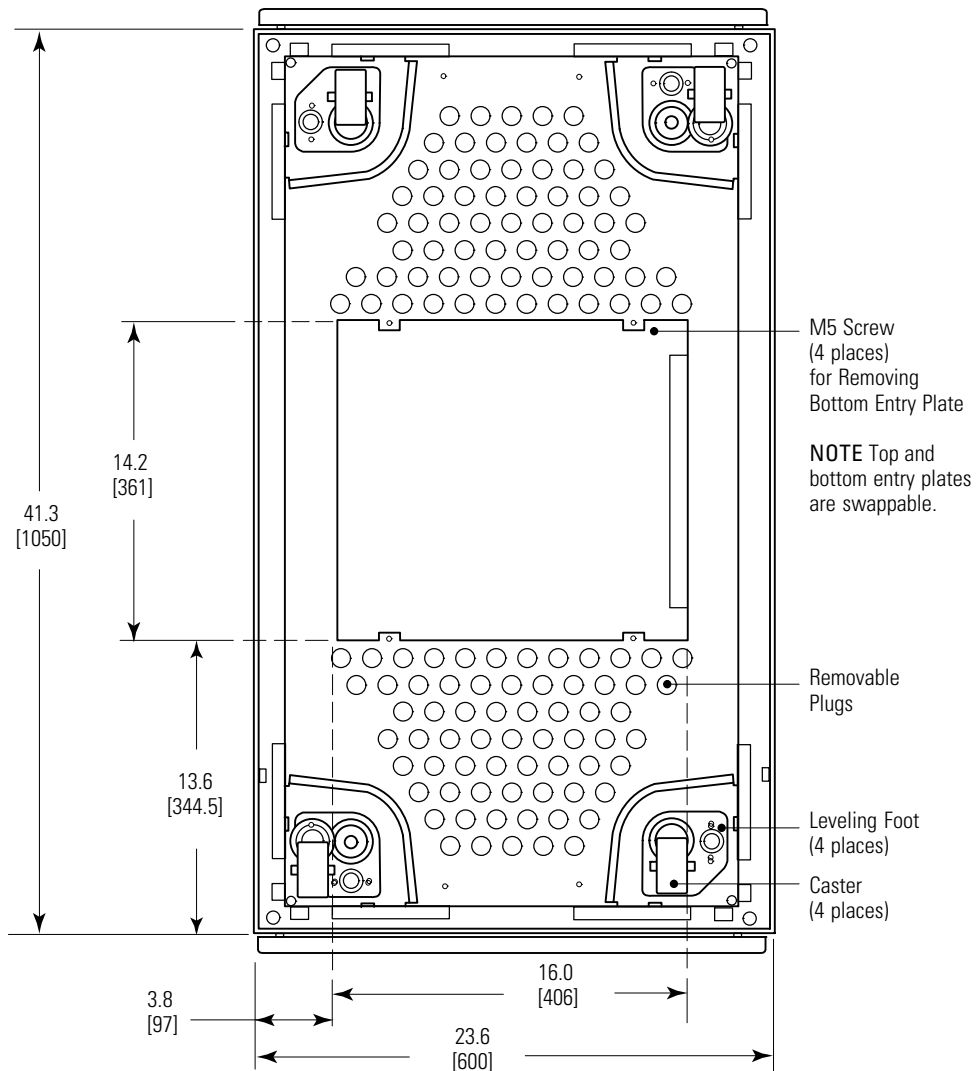
4. Place the supplied arc flash hazard label in a location obvious to the user.

Moving the Cabinet to its Final Location



NOTE *If installing the cabinet over a raised floor, roll the cabinet over two sheets of 3/4" thick plywood to evenly distribute the weight and protect the floor. Use care when positioning the cabinet to avoid the casters falling through the cutouts in the raised floor.*

1. Verify that all steps in "Planning the Cabinet Location" on page 8 have been performed.
2. **Bottom entry wiring.** Install a cutout in the floor as needed, using the template shown in Figure 2.
3. Remove the top entry plate or the bottom entry plate, depending on installation.
4. Roll the cabinet to its final position. For bottom entry wiring, carefully position the cabinet over the cutout in the floor.
5. Use a 1-1/8" open-end wrench to lower each leveling foot until it makes firm contact with the floor. Verify that the cabinet is level. Tighten each leveling foot using a 3/4" open-end wrench. The cabinet is now stable and in place.



NOTE Dimensions are in inches [mm].

Figure 2. PDR Bottom View

Installing the PDR

This section explains wiring installation for the PDR.

The PDR has side panels, exterior doors, and interior barriers that protect the panelboards, breakers, and interior wiring. The panels, doors, and barriers can be removed for ease of installation and maintenance.

Removing the Solid Side Panel



NOTE Follow this procedure for installations with side access only. For configurations without side breakers, remove either or both solid side panels to gain side access. To remove a side panel with breakers, see the following section, "Removing the Side Panel with Breakers."

To remove the solid side panel before wiring:

1. Remove the top screw, bottom screw, and the three screws along each side of the side panel (see Figure 3).
2. Place the side panel in a safe area away from the cabinet to prevent injury or damage to the PDR or personnel. Retain the screws for later use.

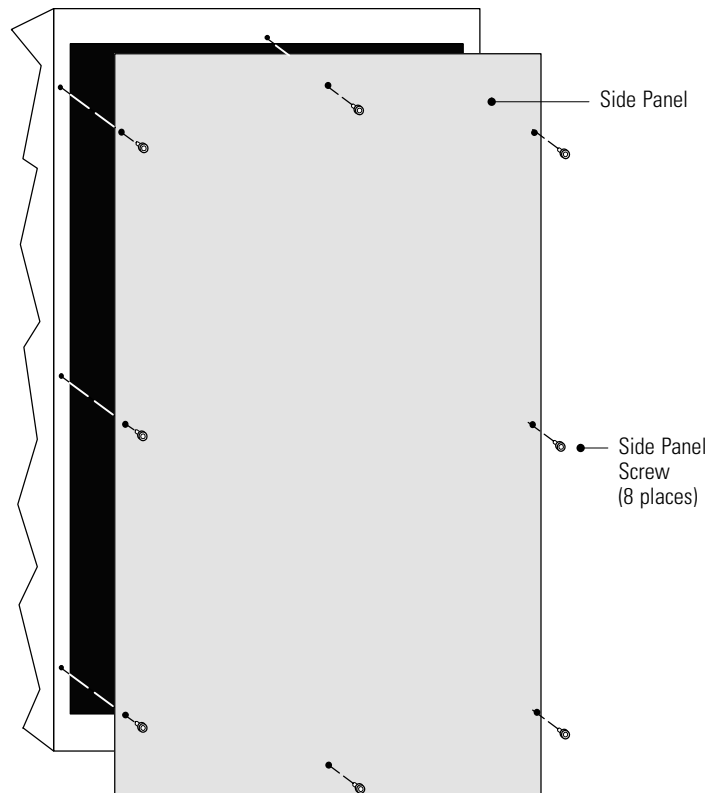


Figure 3. Removing the Solid Side Panel

Removing the Side Panel with Breakers



NOTE Follow this procedure for configurations with side breakers.

To remove the side panel with breakers before wiring:

1. Locate the 10 panel keys supplied in the accessory kit.
2. Slide a panel key into each horizontal panel lock on the side breaker access panel until the key is firmly in place. See Figure 4.

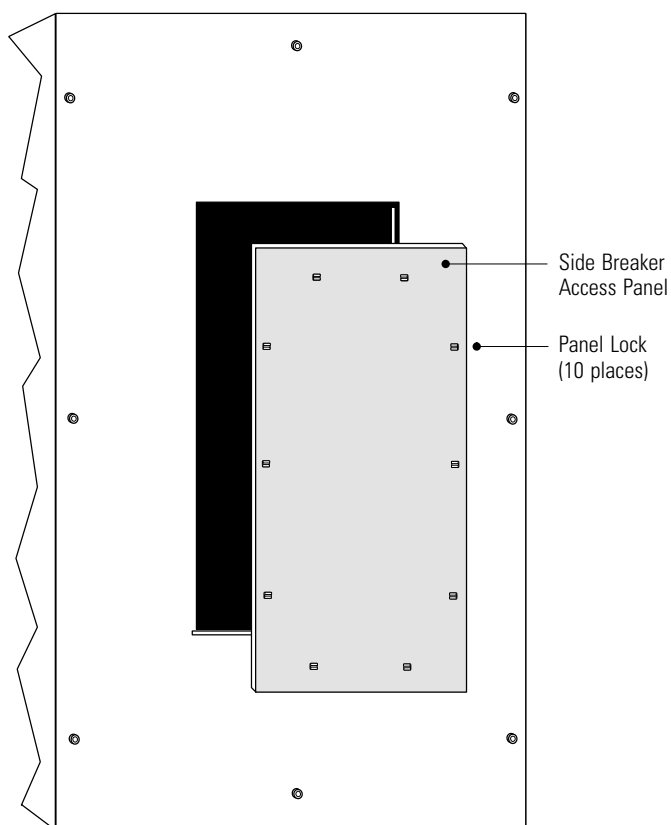


Figure 4. Removing the Side Breaker Access Panel

3. Turn each panel key a quarter turn to unlock the panel lock. The key locks onto the access panel.
4. Grasp the top two panel keys and lift the access panel straight off the cabinet.
5. Place the access panel in a safe area away from the cabinet to prevent injury or damage to the PDR or personnel.

6. Remove the six screws inside the breaker well. There are three screws on each side within the well. Retain the screws for later use. See Figure 5.
7. Remove the top screw, bottom screw, and the three screws along each side of the side panel. Retain the screws for later use.
8. Remove the side panel with the attached breaker well.

Place the side panel with the attached breaker well in a safe area away from the cabinet to prevent injury or damage to the PDR or personnel.

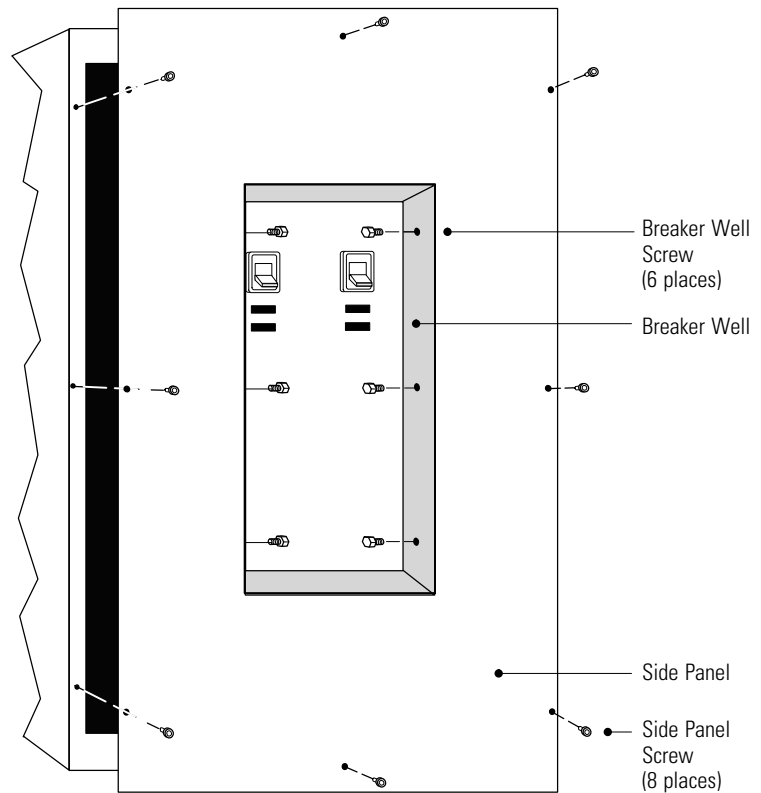


Figure 5. Removing the Side Panel (Dual 400A Main Input Breaker or Dual 600A Main Input Breaker Configuration Shown)

9. Remove the breaker cover (see Figure 6):

Loosen the top screw on each side of the cover. Remove and retain the bottom two screws on each side of the cover.

Slide the cover up and over the top screw on each side.

Place the breaker cover in a safe area away from the cabinet to prevent injury or damage to the PDR or personnel.

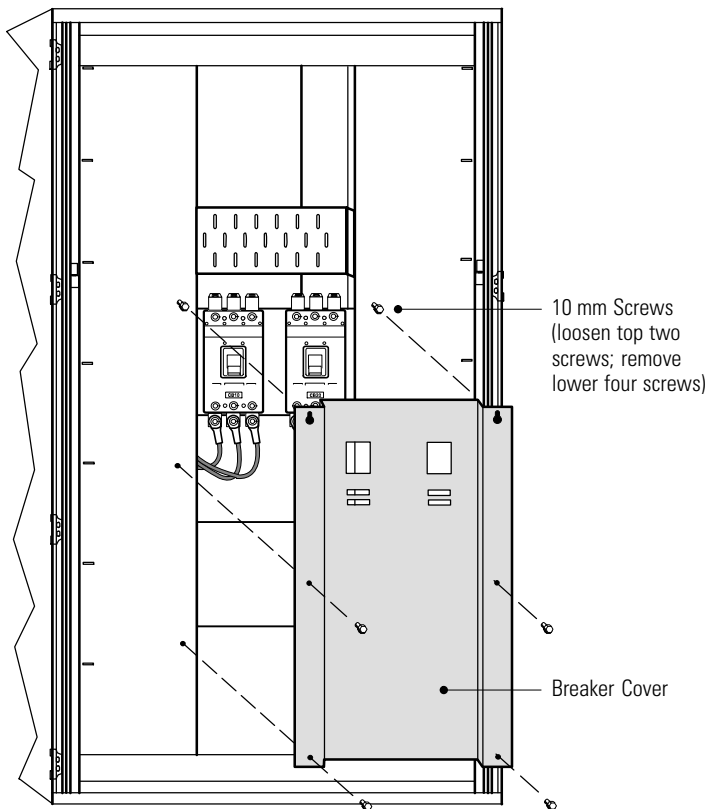


Figure 6. Removing the Breaker Cover (Dual 400A Main Input Breaker or Dual 600A Main Input Breaker Configuration Shown)

Removing the Exterior Doors and Interior Barriers



NOTE *Removing the exterior doors and interior barriers is required for installations with only front and rear access (no side access), and is recommended for all installations for ease of access during installation.*

To remove the exterior doors and interior barriers before wiring:

1. Open the exterior doors.

To open a door, push in on the key lock. The handle pops up. Pull out on the handle.

2. Remove the exterior doors:

To remove a door, use a slotted screwdriver or pliers to move the two ends of each hinge pin apart, then remove the door.

Place the doors in a safe area away from the cabinet to prevent injury or damage to the PDR or personnel.

3. Open the interior barriers in front of the panelboards.

To open a barrier, insert a slotted screwdriver into one of the barrier's access slots and turn to unlock. Repeat for the second access slot. Pull the handle to open the barrier.

4. Remove the interior barriers:

A ground jumper connects the cabinet and one interior barrier. If the ground jumper is connected to the barrier, disconnect the barrier end of the jumper, as shown in Figure 7.

If a Transient Voltage Surge Suppression / Surge Protective Device (TVSS/SPD) is installed on the barrier, disconnect the plug connecting the TVSS/SPD to the cabinet, as shown in Figure 7.

Lift the barrier off its hinges.

Place the barriers in a safe area away from the cabinet to prevent injury or damage to the PDR or personnel.

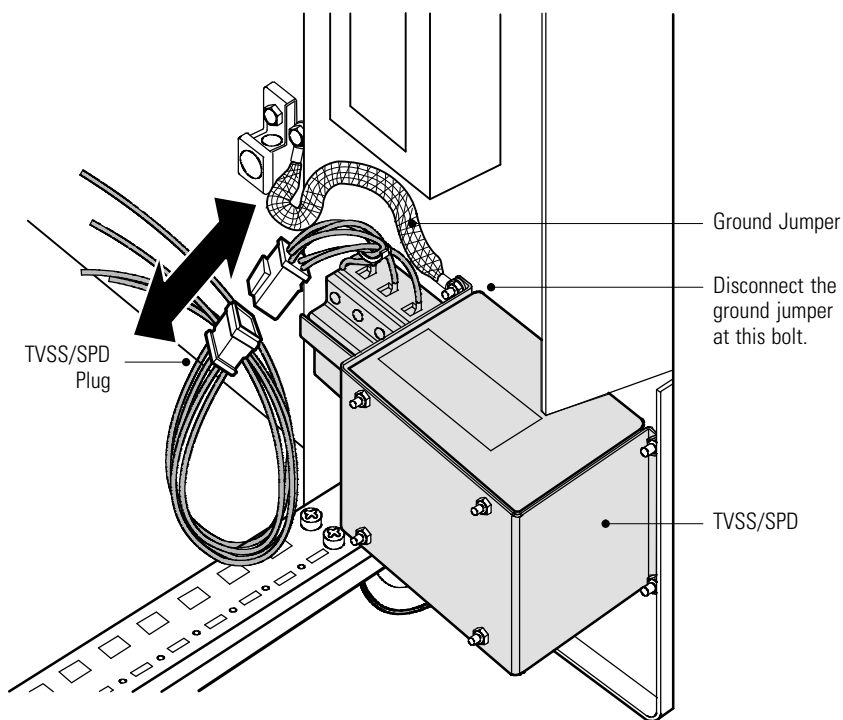


Figure 7. Disconnecting the Ground Jumper and Optional TVSS/SPD

Wiring Input and Output Power

WARNING



Only qualified service personnel (such as a licensed electrician) shall perform the electrical installation. Risk of electrical shock.



NOTE Installation of the PDR must comply with the requirements of ANSI/NFPA 75 and National Electrical Code® (NEC®) Article 645 when installed within a computer room.

NOTE External overcurrent protection and disconnect are not provided by this product, but are required by codes. Refer to Table 3 for feeder breaker and wire size requirements.

NOTE All wiring must conform to national and local codes. Provide sufficient room for routing all power cables. Route all signal cables separately from power cables.

To wire input and output power to the PDR:

1. Turn off utility power at the distribution point where the PDR will be connected. Be absolutely sure there is no power.
2. Verify that all circuit breakers are in the OFF position.
3. **(Optional) Quad-Feed Input, Single 800A Main Input Lug, and Dual 800A Main Input Lug configurations with side access.** For ease of installation, remove the busbar shield from each side of the cabinet (near the top of the cabinet).

To remove a busbar shield, remove the six push-in clips, then pull the shield away. Retain the clips and shield for later use.

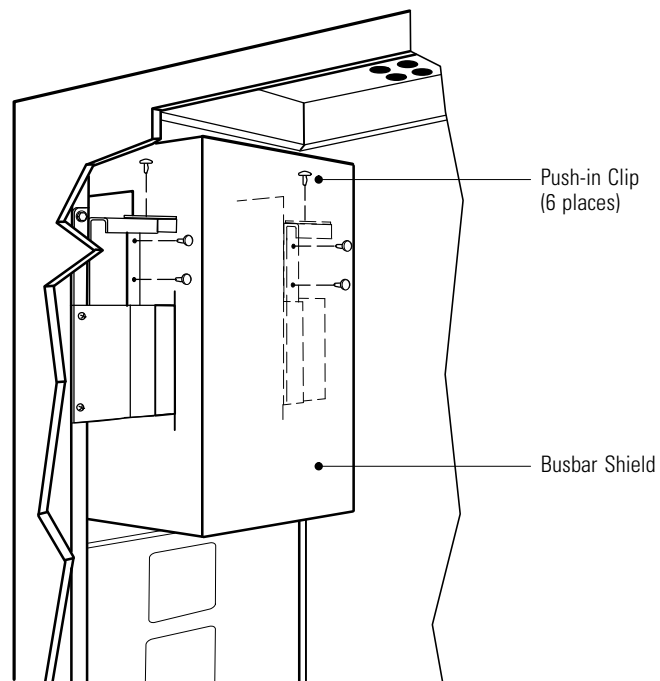


Figure 8. Removing the Busbar Shield (Optional)

4. Note the specifications in Table 2 and Table 3 for wiring input power.



NOTE Per NEC Article 300-20(a), all three-phase conductors must be run in the same conduit. Neutral and ground must be run in the same conduit as the phase conductors.

Table 2. Main Input Feed Conductor Coding

PDR Configurations	Conductor	Code	Type and Size Connector	Tightening Torque Nm (lb in)
All	Ground (4W+G)	Green (or Ground Symbol)	Compression Lug #6-300 MCM AI9CU	31.1 (275)
Quad-Feed Input	Neutral	White (or N)	Compression Lug #6-300 MCM AI9CU	31.1 (275)
All except Quad-Feed Input	Neutral	White (or N)	Compression Lug #2-600 MCM AI9CU	31.1 (275)
Quad-Feed Input Single 800A Main Input Lug Dual 800A Main Input Lug	Phase A	A	Lug Insulated Ring Tongue 4/0 (see Note 1)	20.3 (180)
	Phase B	B	Lug Insulated Ring Tongue 4/0 (see Note 1)	20.3 (180)
	Phase C	C	Lug Insulated Ring Tongue 4/0 (see Note 1)	20.3 (180)
Single 400A Main Input Breaker	Phase A	A	See Note 2	See Note 2
Dual 400A Main Input Breaker	Phase B	B	See Note 2	See Note 2
Single 600A Main Input Breaker	Phase C	C	See Note 2	See Note 2
Dual 600A Main Input Breaker				

NOTE 1 Recommended tool for crimping 4/0 ring lug:

Molex Hydraulic Head Crimper with Air/Hydraulic Pump (Molex P/N 19286-0117) plus Molex HHL Tooling Kit P/N 19286-0031 or Hydraulic Head Crimper with Electric Hydraulic Pump (Molex P/N 19286-1300) plus Molex HHL Tooling Kit P/N 19286-0031.

NOTE 2 See markings on breaker for tightening torque.

Table 3. Conductor Sizing

Configuration	Input Volts	Input Current	Panelboard Breaker	Feeder Breaker	Wire Size*	Number of Parallel Sets of Conductors
Quad-Feed Input	208V	180A	225A	225A	40 mm ² (1 AWG)	2
	208V	320A	400A	400A	107 mm ² (4/0 AWG)	2
Single 800A Main Input Lug	208V	720A	225A	800A	107 mm ² (4/0 AWG)	4
	208V	800A	400A	800A	107 mm ² (4/0 AWG)	4
Dual 800A Main Input Lug	208V	360A	225A	450A	107 mm ² (4/0 AWG)	2
	208V	640A	400A	800A	107 mm ² (4/0 AWG)	4
Single 400A Main Input Breaker Dual 400A Main Input Breaker	208V	320A	—	—	107 mm ² (4/0 AWG)	2
Single 600A Main Input Breaker Dual 600A Main Input Breaker	208V	480A	—	—	107 mm ² (4/0 AWG)	3

* Wire sizes based on NEC 2008 Table 310-16 using 90°C copper conductors.



CAUTION

Be absolutely sure there is no power.

5. Quad-Feed Input configuration. Install the neutral connection:

For the first or only panelboard, connect the neutral cable to the neutral busbar (see Figure 9, Table 2, and Table 3).

Repeat the neutral connection for any remaining installed panelboards.

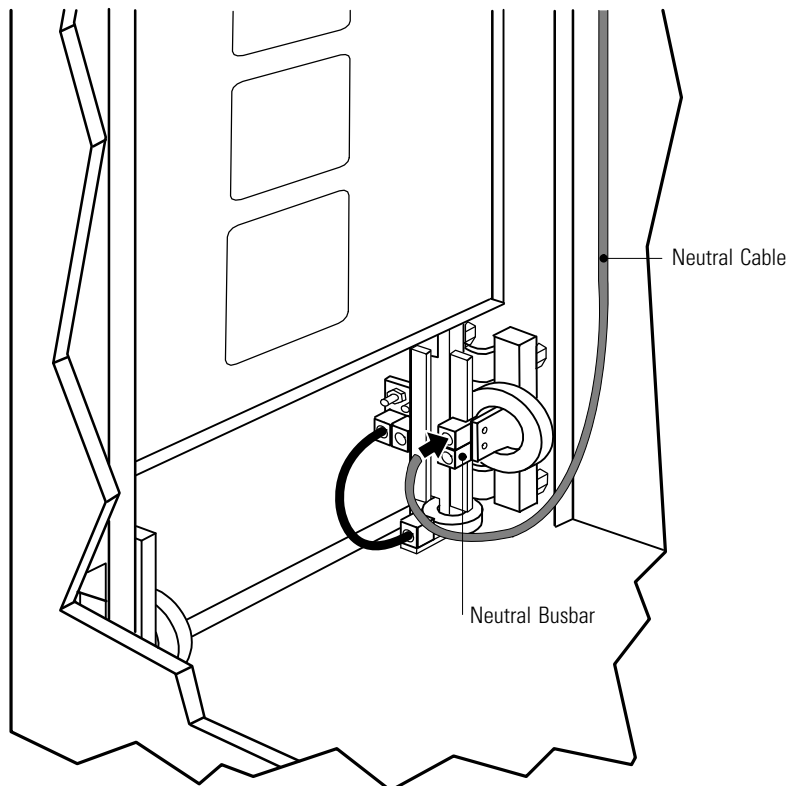


Figure 9. Installing the Neutral (Quad-Feed Input Configuration)



NOTE Figure 9 shows top entry wiring and side access installation.



CAUTION

Be absolutely sure there is no power.

6. Quad-Feed Input configuration. The cabinet has a ground jumper installed from the chassis ground to the isolated ground busbar. Adjust the installation for the required ground system (see Figure 10, and Table 2 and Table 3 on page 19):

Non-isolated ground system. Leave the ground jumper installed. Connect the ground cable to the second chassis ground lug.

Isolated ground system. For the first or only panelboard, remove the installed ground jumper, then connect the isolated ground cable to the isolated ground busbar. Repeat for any remaining installed panelboards. Then connect the earth ground cable to the chassis ground.

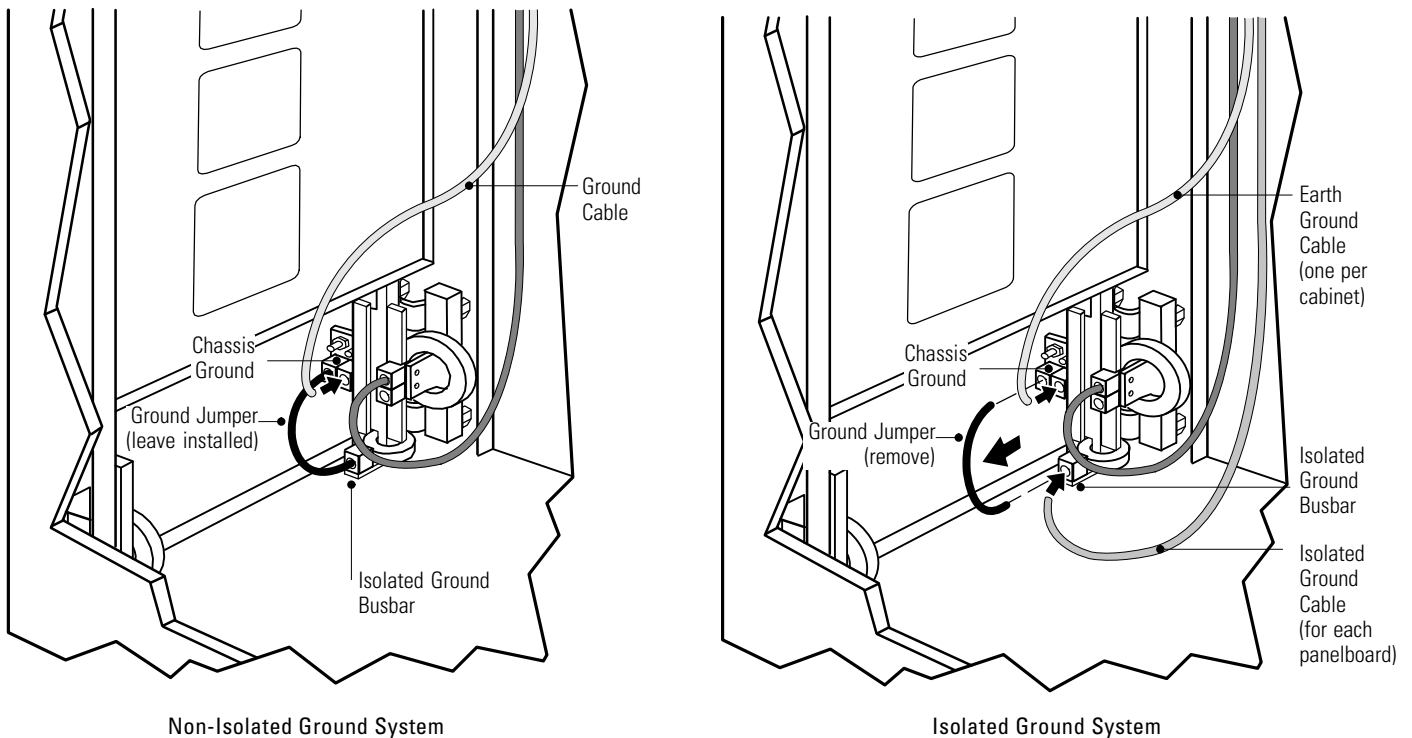


Figure 10. Installing the Ground System (Quad-Feed Input Configuration)



NOTE Figure 10 shows top entry wiring and side access installation.



CAUTION

Be absolutely sure there is no power.

7. Single 800A Main Input Lug, Single 400A Main Input Breaker, and Single 600A Main Input Breaker configurations. Install the neutral connection (see Figure 11, and Table 2 and Table 3 on page 19):

Locate the supplied current transformers (CTs) hanging at the base of the panelboard mounting plate: two ground CTs (labeled "G") and, if ordered, two neutral CTs (labeled "N"). Cut the tie-wraps to remove the CTs from the plate, but DO NOT detach the blue and white wiring connecting each CT to the cabinet.

Retain the two ground CTs for later installation in Step 8.

If ordered, install both neutral CTs on the neutral cable. Secure the CTs to the cable with tie-wraps (not supplied).

Connect the neutral cable to the neutral busbar.

Factory Location of CTs for Customer Installation
NOTE Neutral CTs are optional.

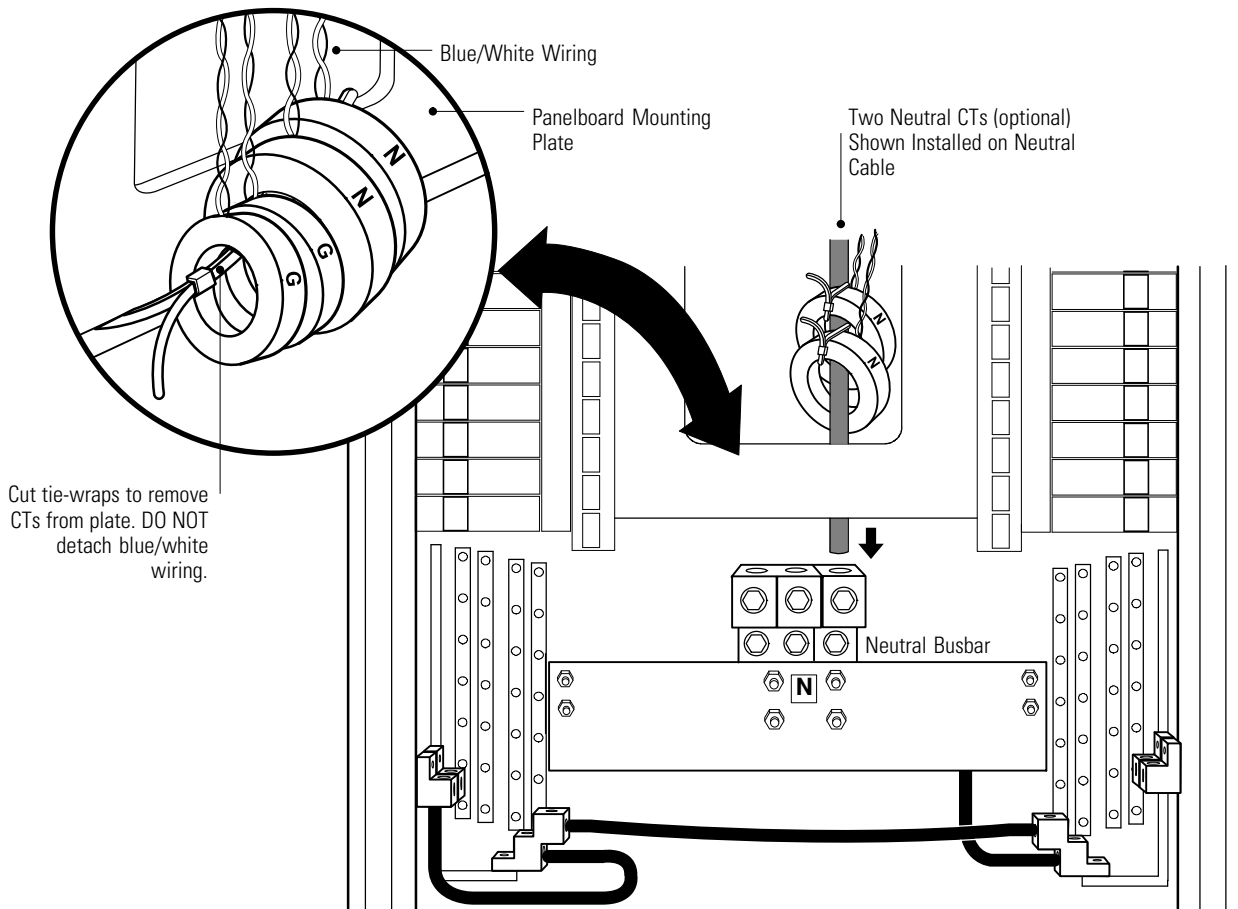


Figure 11. Installing the Neutral (Single 800A Main Input Lug, Single 400A Main Input Breaker, and Single 600A Main Input Breaker)



NOTE Figure 11 shows top entry wiring, one panelboard, optional neutral CTs for measured neutral current, and front access installation.



CAUTION

Be absolutely sure there is no power.

- 8. Single 800A Main Input Lug, Single 400A Main Input Breaker, and Single 600A Main Input Breaker configurations.** The cabinet has a ground jumper installed from the chassis ground to the isolated ground busbar. Adjust the installation for the required ground system (see Figure 12, and Table 2 and Table 3 on page 19):

Non-isolated ground system. Leave the ground jumper installed. Install the two ground CTs (retained in Step 7) on the ground cable, then connect the ground cable to the second chassis ground lug. Secure the CTs to the cable with tie-wraps (not supplied).

Isolated ground system. Remove the installed ground jumper. Install the two ground CTs (retained in Step 7) on the isolated ground cable, then connect the isolated ground cable to the isolated ground busbar. Secure the CTs to the cable with tie-wraps (not supplied). Then connect the earth ground cable to the chassis ground.

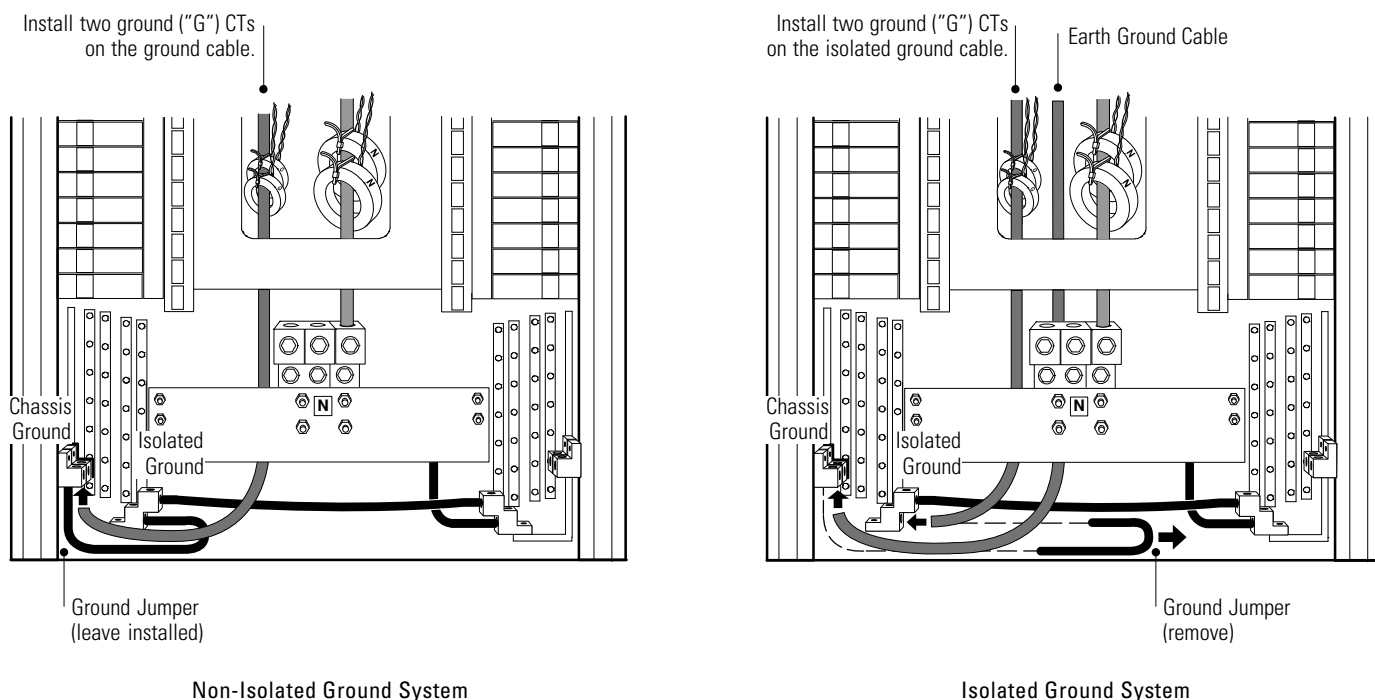


Figure 12. Installing the Ground System (Single 800A Main Input Lug, Single 400A Main Input Breaker, and Single 600A Main Input Breaker)



NOTE Figure 12 shows top entry wiring, one panelboard, optional neutral CTs for measured neutral current, and front access installation.



CAUTION

Be absolutely sure there is no power.

9. Dual 800A Main Input Lug, Dual 400A Main Input Breaker, and Dual 600A Main Input Breaker configurations. Connect the neutral cables to the neutral busbars (see Figure 13, and Table 2 and Table 3 on page 19):

If ordered, locate the two supplied neutral CTs (labeled “N”) hanging at the base of the panelboard mounting plate. Cut the tie-wraps to remove the CTs from the plate but **DO NOT** detach the blue and white wiring connecting each CT to the cabinet.

If ordered, install one neutral CT on the neutral cable for the first side. Secure the CT to the cable with tie-wraps (not supplied).

Connect the neutral cable for the first side to its neutral busbar.

Repeat for the second side’s neutral CT (if ordered) and neutral connection.

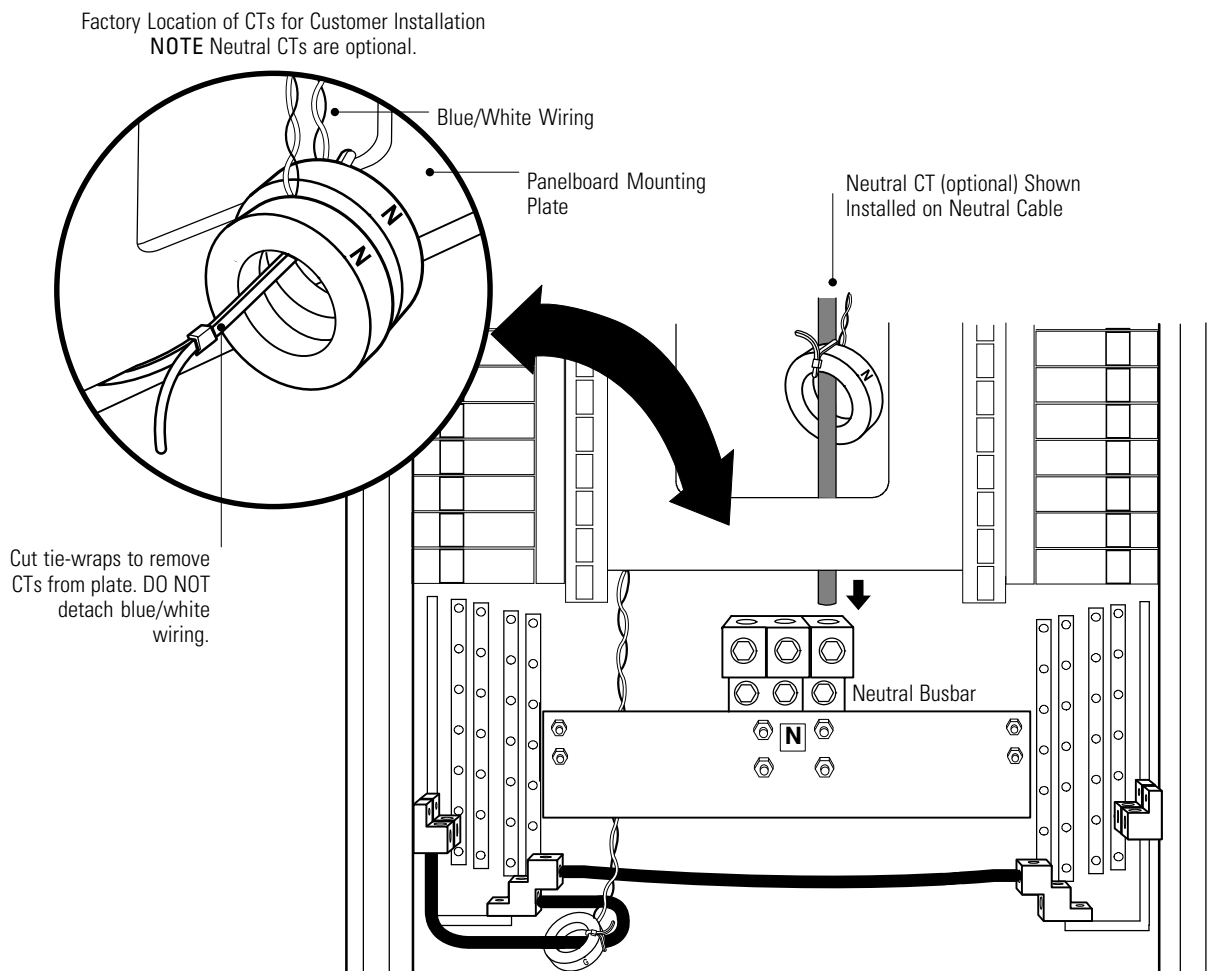


Figure 13. Installing the Neutral (Dual 800A Main Input Lug, Dual 400A Main Input Breaker, and Dual 600A Main Input Breaker)



NOTE Figure 13 shows top entry wiring, optional neutral CTs for measured neutral current, and front access installation.



CAUTION

Be absolutely sure there is no power.

10. Dual 800A Main Input Lug, Dual 400A Main Input Breaker, and Dual 600A Main Input Breaker configurations. The cabinet has a ground jumper installed from the chassis ground to the isolated ground busbar, with a ground CT installed on the ground jumper. Adjust the installation for the required ground system (see Figure 14, and Table 2 and Table 3 on page 19):

Non-isolated ground system. Leave the ground jumper and its ground CT installed. Connect the ground cable to the second chassis ground lug.

Isolated ground system. For the first side, remove the installed ground jumper and cut the tie-wraps to remove the ground CT from the jumper but DO NOT detach the blue and white wiring connecting the CT to the cabinet. Install the ground CT on the isolated ground cable, then connect the isolated ground cable to the isolated ground busbar. Secure the CT to the cable with tie-wraps (not supplied). Repeat for the second side. Then connect the earth ground cable to the chassis ground.

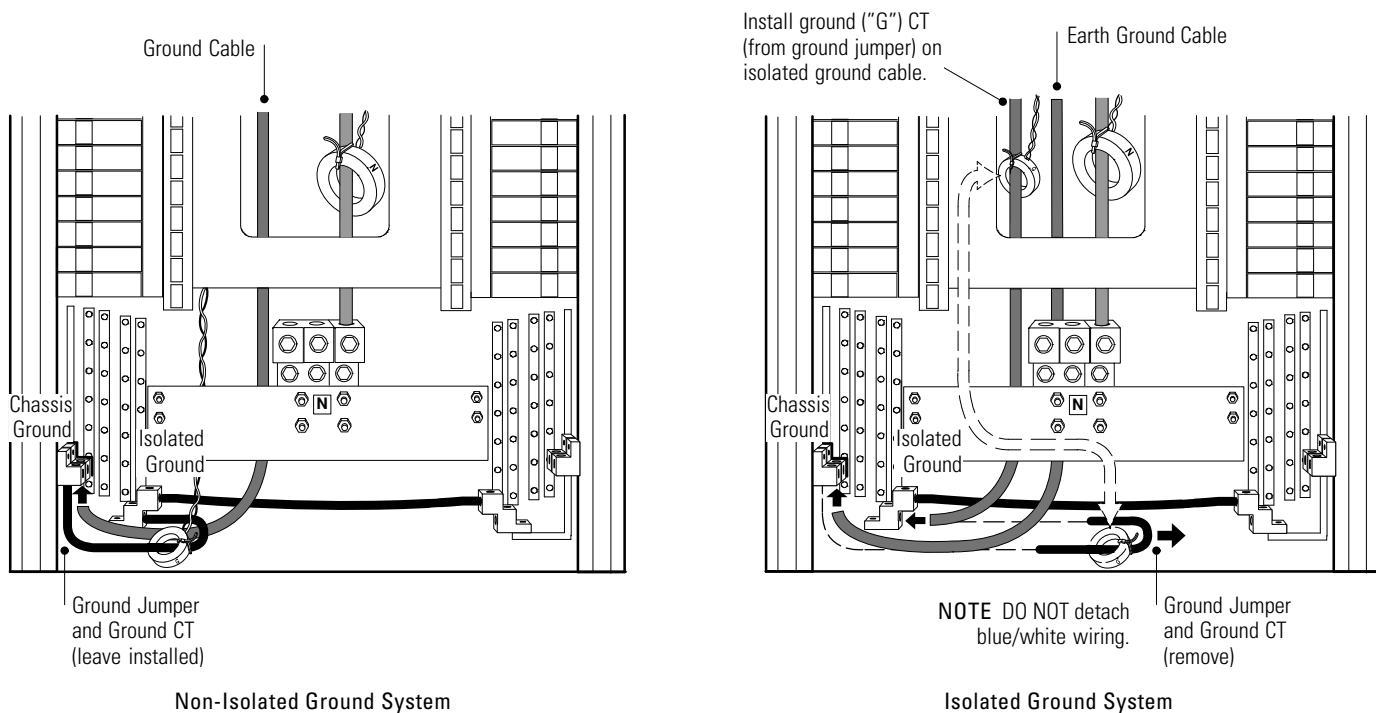


Figure 14. Installing the Ground System (Dual 800A Main Input Lug, Dual 400A Main Input Breaker, and Dual 600A Main Input Breaker)



NOTE Figure 14 shows top entry wiring, optional neutral CTs for measured neutral current, and front access installation.

11. Continue to the applicable step for the configuration you are installing:

Configuration	Continue to
Quad-Feed Input	Step 12
Single 800A Main Input Lug with two sides (front and rear)	Step 13 on page 27
Single 800A Main Input Lug with one side (front)	Step 14 on page 28
Dual 800A Main Input Lug	Step 14 on page 28
Single 400A Main Input Breaker or Dual 400A Main Input Breaker	Step 15 on page 29
Single 600A Main Input Breaker or Dual 600A Main Input Breaker	Step 15 on page 29

12. **Quad-Feed Input configuration.** Connect a dedicated feeder to provide the input power to the PDR according to Table 2 and Table 3 on page 19:

Connect the cables to the panel busbars. Terminate each cable with a supplied ring terminal and nut.

Top Entry. Bring the cables straight down from the top of the cabinet, past the bar structures, then loop each cable up to its landing (as shown in Figure 15).

Bottom Entry. Bring each cable up from the bottom of the cabinet to its landing.

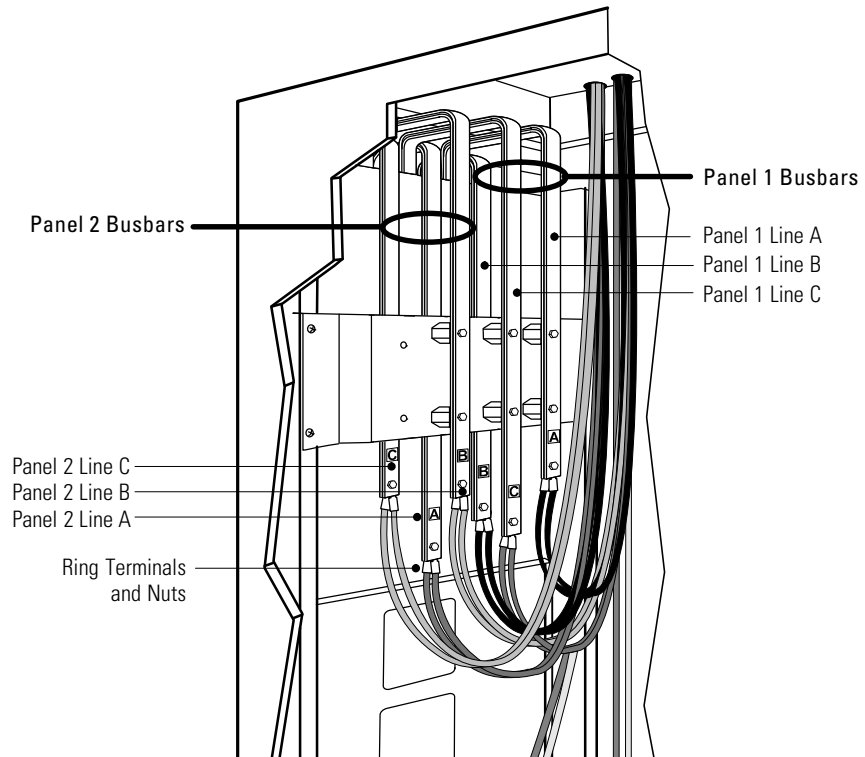


Figure 15. Quad-Feed Input Configuration



NOTE Figure 15 shows top entry wiring, one side, side access installation, and the busbar shield removed.

NOTE Front access installation. The busbar connections below the panel main breakers are labeled (left to right): A, B, C, A, B, C. Access the connection points by working between the factory-installed cables and through the holes in the panelboard mounting plate.

13. Single 800A Main Input Lug with two sides (front and rear) configuration. Connect a dedicated feeder to provide the input power to the PDR according to Table 2 and Table 3 on page 19:

Locate the three supplied CT assemblies (labeled A, B, and C) hanging from the factory wiring in the center of the cabinet (see Figure 16). Cut the tie-wraps to remove the CTs from the large factory wires, but DO NOT detach the blue and white wiring connecting each CT to the cabinet.

With the polarity dot on the CT oriented up, install the appropriate CT onto the wiring for each phase (see Figure 16). For example, install the “A” CT onto the phase A wiring. Connect the cables to the studs at the base of the bars. Terminate each cable on its stud with a supplied ring terminal and nut. Secure the CTs to the wires with tie-wraps (not supplied).

Top Entry. Bring the cables straight down from the top of the cabinet, past the bar structures, then loop each cable up to its landing (as shown in Figure 16).

Bottom Entry. Bring each cable up from the bottom of the cabinet to its landing.

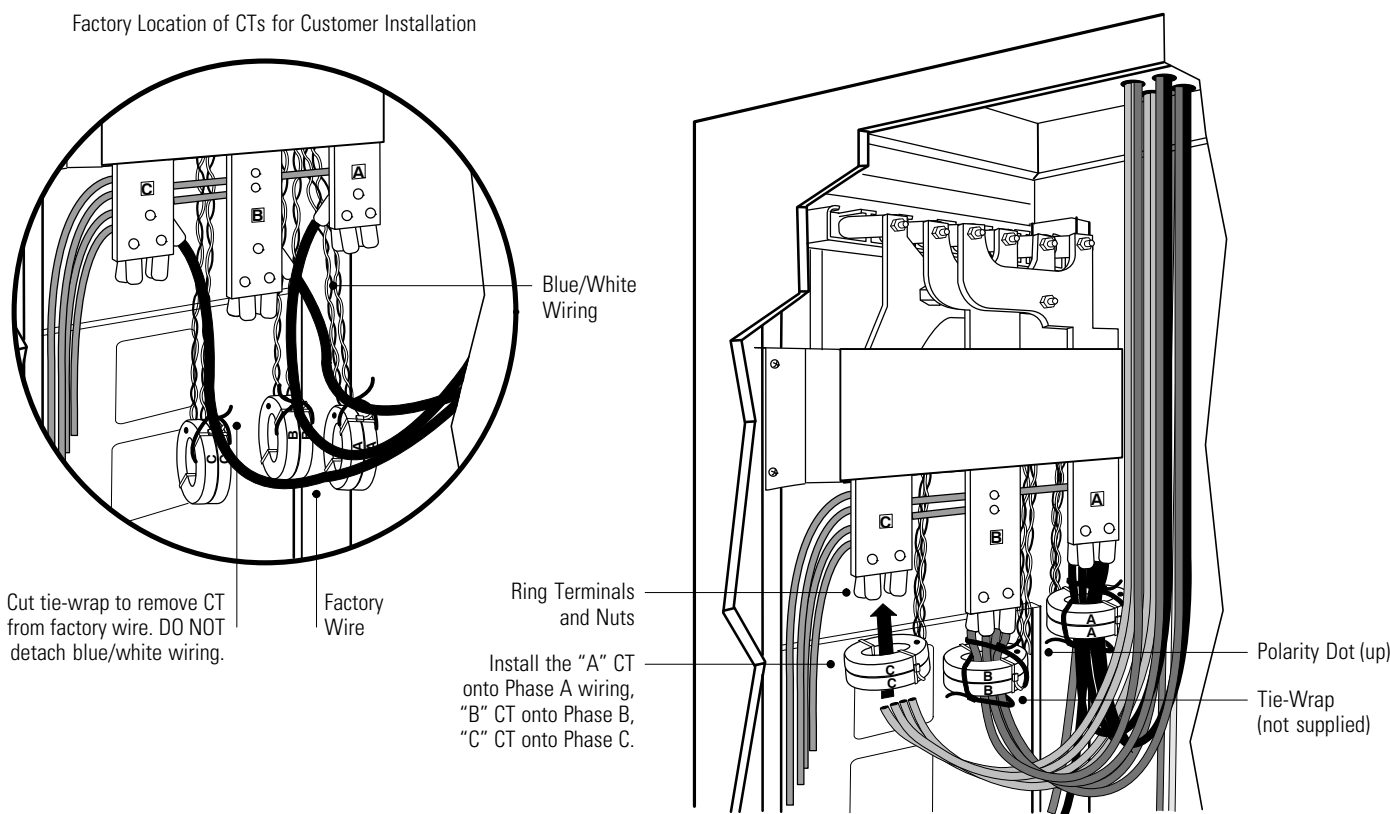


Figure 16. Single 800A Main Input Lug Configuration with Two Sides (Front and Rear)



NOTE Figure 16 shows top entry wiring, one side, side access installation, and the busbar shield removed.

NOTE Front access installation. The busbar connections below the panel main breakers are labeled (left to right): A, B, C. Access the connection points by working between the factory-installed cables and through the holes in the panelboard mounting plate.

14. Dual 800A Main Input Lug configuration and Single 800A Main Input Lug with one side (front) configuration. Connect a dedicated feeder to provide the input power to the PDR according to Table 2 and Table 3 on page 19:

Connect the cables to the studs at the base of the bars. Terminate each cable on its stud with a supplied ring terminal and nut, using as many landings as required by the cable sizing.

Top Entry. Bring the cables straight down from the top of the cabinet, past the bar structures, then loop each cable up to its landing (as shown in Figure 17).

Bottom Entry. Bring each cable up from the bottom of the cabinet to its landing.

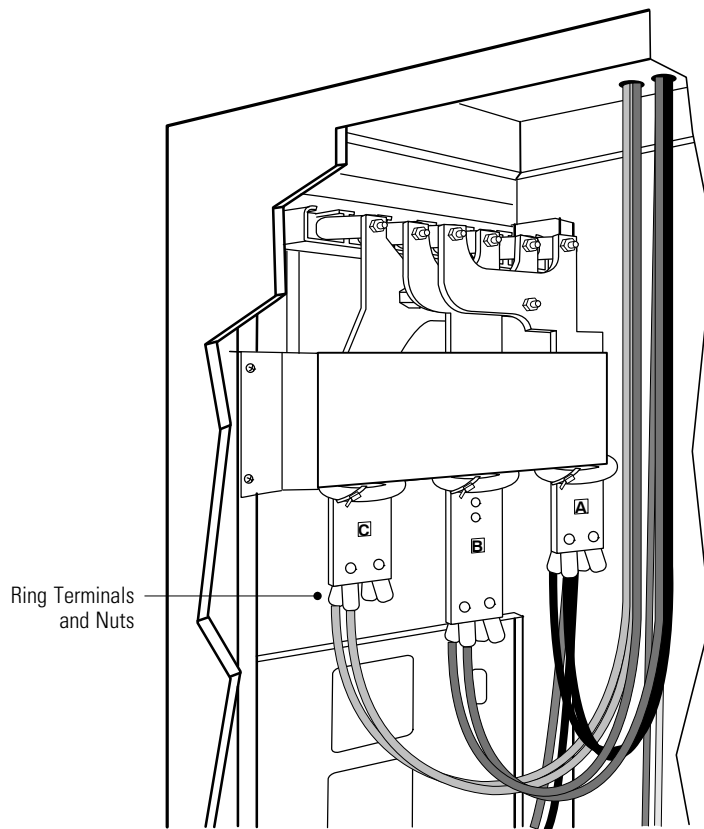


Figure 17. Dual 800A Main Input Lug Configuration and Single 800A Main Input Lug with One Side Configuration



NOTE Figure 17 shows top entry wiring, one side, side access installation, and the busbar shield removed.

NOTE Front access installation. The busbar connections below the panel main breakers are labeled (left to right): A, B, C. Access the connection points by working between the factory-installed cables and through the holes in the panelboard mounting plate.

- 15. Single 400A Main Input Breaker, Dual 400A Main Input Breaker, Single 600A Main Input Breaker, and Dual 600A Main Input Breaker configurations.** Connect a dedicated feeder to provide the input power to the PDR according to Table 2 and Table 3 on page 19:

Connect the cables to the top of the main input breaker or breakers. For wire sizing requiring double lugs per connection, use finger pressure to pull off the breaker lug caps covering the second row of lugs.

Top Entry. Bring the cables straight down from the top of the cabinet, then land each cable on top of the main input breaker or breakers (as shown in Figure 18).

Bottom Entry. Bring each cable up from the bottom of the cabinet to its landing. Use the large strain relief bracket installed above the breakers to provide adequate strain relief for the cables.

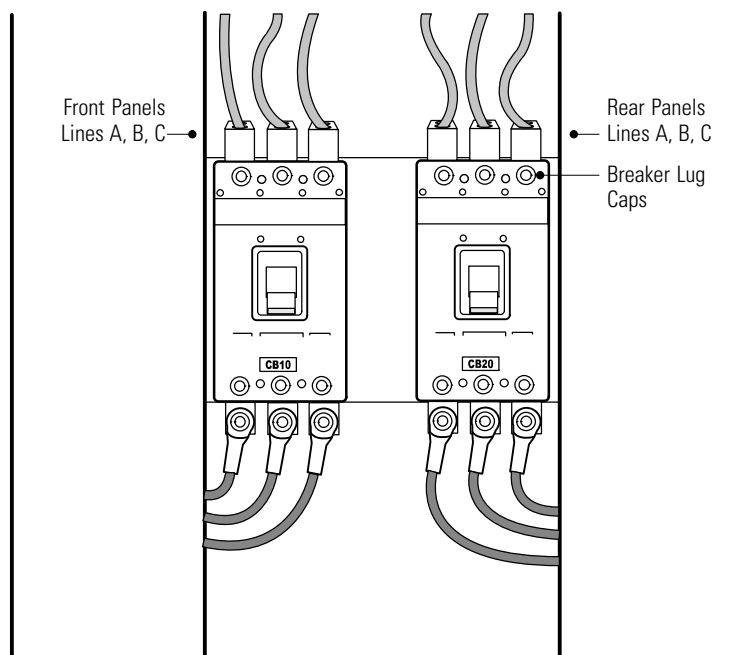


Figure 18. Configurations with Single or Dual Main Input Breakers



NOTE Figure 18 shows top entry wiring and dual main input breakers.

16. Quad-Feed Input, Single 800A Main Input Lug, and Dual 800A Main Input Lug configurations. If removed in Step 3 on page 18, reinstall the busbar shield.

17. Connect the output power to the 42-pole circuit breaker panelboards according to the branch circuit breaker manufacturer’s ratings and instructions, Figure 20, and Table 4. For each pole, install the customer-supplied branch circuit breaker (if not factory-installed) and wire the breaker, ground, and neutral wires. Balance the loads. Provide adequate strain relief and retention for each wire.

Top Entry. Bring the cables straight down from the top interior of the cabinet, to the bottom of the cabinet, then loop each cable to the front of the cabinet and up to its landing.

Bottom Entry. Bring each cable up from the bottom of the cabinet to its landing.



NOTE All connections and wiring methods must comply with NEC and other applicable codes.

Compatible branch circuit breakers are 1-pole 10–60A, 2-pole 10–60A, and 3-pole 15–60A, according to the following table.

Panel Type	Breaker Numbering (Top to Bottom)	Compatible Breakers
Cutler-Hammer column	Each column is numbered 1–42.	Cutler-Hammer type BAB, BAB-H, HBAX, or HBAW



NOTE If the optional BCMS metering is installed, route branch wiring through the CT opposite the breaker terminal to the breaker lug. Use care when bending and routing the wires through the CTs. See Figure 19.

NOTE Use THHN wire for branch circuit output distribution. Using THHN wire will facilitate routing the wire through the branch CTs to the branch breakers.

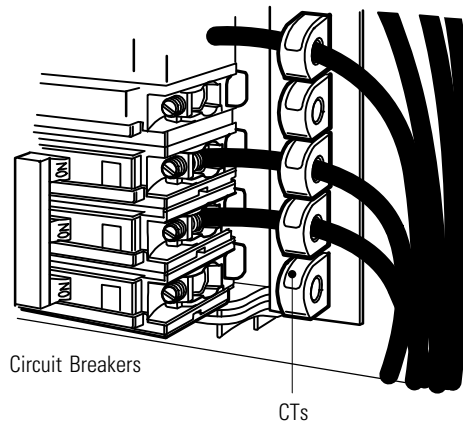


Figure 19. Wiring the CTs (BCMS Only)

18. Optional. Directory labels (see Figure 20) are installed on the inside of the interior barriers for identifying branch circuit numbers and equipment being served. Use an erasable pen or #2 pencil to identify the breakers.

The magnetic labels are easily moved or removed if needed. For ease of viewing, move the labels to the outside of the interior barrier.

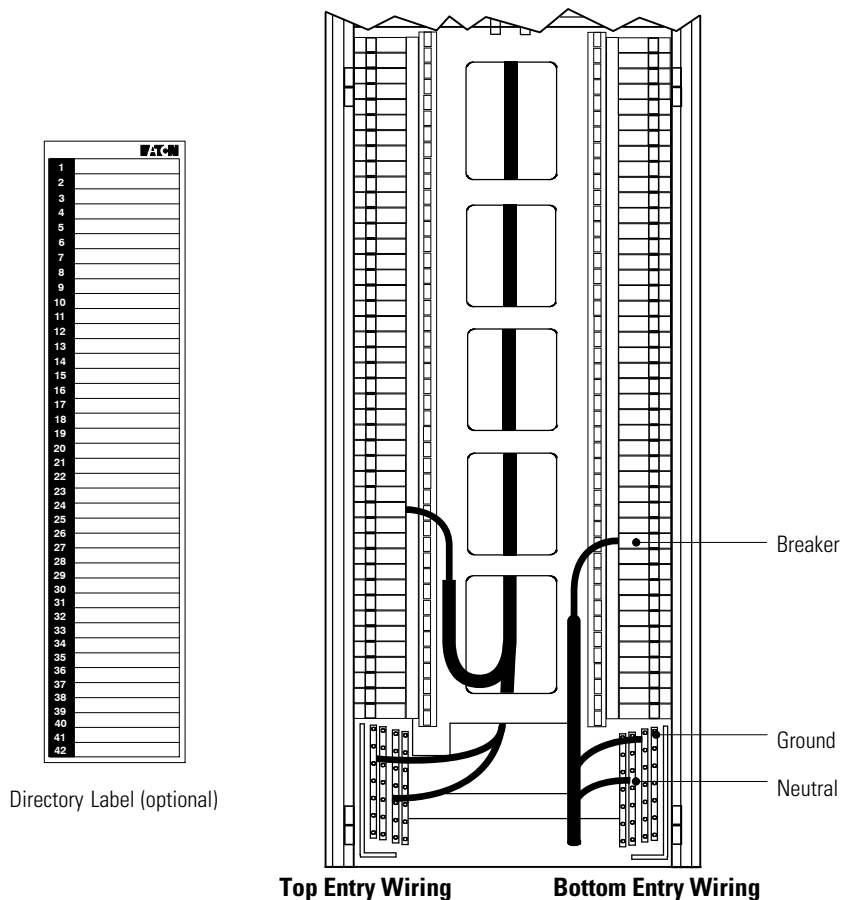


Figure 20. Wiring the Output Connections

Table 4. Torque Specifications

Number of Wires	Wire Size	Branch Breakers	Panelboard Breakers			
			Slotted Head Screw Slot Length		Socket Head Screw Socket Size	
			Over 1/4"	1/4" and Less	3/16"	5/32"
1	2.1–5.3 mm ² (14–10 AWG)	2.3 Nm (20 lb in)	4.0 Nm (35 lb in)	2.3 Nm (20 lb in)	—	—
1	8.4 mm ² (8 AWG)	2.8 Nm (25 lb in)	4.5 Nm (40 lb in)	2.8 Nm (25 lb in)	—	—
1	13.3–18.0 mm ² (6–4 AWG)	3.1 Nm (27 lb in)	5.1 Nm (45 lb in)	4.0 Nm (35 lb in)	13.6 Nm (120 lb in)	11.3 Nm (100 lb in)

Initial Startup



WARNING

Only qualified service personnel (such as a licensed electrician) shall perform the initial startup. Risk of electrical shock.

To start up the PDR:

1. Turn off utility power at the distribution point where the PDR will be connected. Be absolutely sure there is no power.
2. Verify that all circuit breakers are in the OFF position.
3. Remove any foreign objects from the interior of the unit.
4. Complete the installation checklist (see page 34).
5. Turn on utility power to the PDR.
6. **Configurations with side breakers.** Turn the main input breaker(s) to the ON position.
7. Verify that the display activates after approximately 30 seconds. If two displays are installed, verify that both activate.
8. Verify and record the input voltages on the panelboard circuit breaker(s) in Table 5.



NOTE If the input voltage is incorrect, check for wiring errors or improper transformer tap.

Table 5. Panelboard Circuit Breaker Input Voltages at Startup

Breaker	Phase Voltages					
	A-B	B-C	C-A	A-N	B-N	C-N
1						
2						
3						
4						

9. Turn the panelboard circuit breaker(s) to the ON position.

If the breaker trips within one minute, contact your service representative for assistance.



NOTE The control circuit is energized regardless of the status of the panelboard breaker (on, tripped, or off).

10. Verify that the Off and Alarm indicators are off and the On indicator is illuminated.
11. Check the phase rotation at the line side of the terminals of the panelboard breaker(s) and any subfeed circuit breakers.

The rotation should be A, B, C, top to bottom.

12. Set the options recommended in “Initial Configuration” on page 39.
13. Turn the individual panelboard circuit breakers to the ON position following the startup sequence recommended by the load equipment manufacturer.
14. Follow the “Shutdown” procedure on page 40 to shut down the PDR before continuing to the next section.

Replacing the Interior Barriers, Exterior Doors, and Side Panels



NOTE All interior barriers, exterior doors, and side panels removed during installation must be replaced prior to placing the PDR in service.

To replace the interior barriers, exterior doors, and side panels:

1. Replace each interior barrier removed:

Place each interior barrier on its hinges. If a TVSS/SPD is installed on the barrier, reconnect the device to the cabinet. If a ground jumper is installed on the barrier, reconnect the jumper to the cabinet. See Figure 7 on page 17.
2. **Optional.** Verify that the magnetic directory labels are placed in positions convenient for viewing, and that each label is correctly marked with the names of the loads being served.
3. Close each interior barrier. Insert a slotted screwdriver into one access slot and turn to lock. Repeat for the second access slot to secure the barriers.
4. Replace each exterior door removed:

To replace a door, hang the door on its hinges, then snap the hinge pins back into place.
5. Close the exterior doors.

Optional. Lock the exterior doors with the supplied key.
6. **Configurations with side breakers.** Replace the breaker cover, side panel, and side breaker access panel:

Hang the breaker cover on its top two screws. Reinstall the remaining four screws, and tighten all six screws.

Reinstall the side panel using the eight retained screws at the top, bottom, and sides of the panel, then reinstall the six retained screws on the sides of the breaker well.

Grasp the two panel keys at the top of the side breaker access panel and place the access panel on the side panel, inserting the access panel lock pins into the square holes on the side panel. Turn each key a quarter turn to lock it, and remove the key. Place the panel keys in a safe area.
7. Replace each solid side panel removed:

To replace a side panel, reinstall the panel using the eight retained screws at the top, bottom, and sides of the panel.

Completing the Installation Checklist

The final step in installing the PDR is completing the following Installation Checklist. This checklist ensures that you have completely installed all hardware, cables, and other equipment. Complete all items listed on the checklist to help ensure a smooth installation. Make a copy of the checklist before filling it out, and retain the original.



NOTE *The installation checklist MUST be completed prior to starting the PDR for the first time.*

Installation Checklist

- All packing materials and restraints have been removed.
- The PDR is placed in its installed location and all doors, interior barriers, and side panels are installed and secure.
- All conduits and cables are properly routed to the PDR.
- All power cables are properly sized and terminated.
- Branch circuit breakers are installed and wired to load.
- Input power connections are properly installed, including ground conductors.
- Ground jumper between cabinet and interior barrier is properly installed.
- Neutral conductors are installed or bonded to ground.
- Quad-Feed Input, Single 800A Main Input Lug, and Dual 800A Main Input Lug configurations.** Busbar shield or shields in the interior top of the cabinet are properly installed.
- No foreign objects are inside the cabinet.
- LAN and telephone drops are installed, and LAN and telephone connections have been completed. (Optional)
- The area around the installed PDR is clean and dust-free. (The PDR must be installed on a level floor suitable for computer or electronic equipment.)
- Adequate workspace exists around the PDR.
- Adequate lighting is provided around the PDR.

This chapter describes how to use the PDR, including front panel operation, initial configuration, side breaker access, startup and shutdown, and using the Transient Voltage Surge Suppression / Surge Protective Device (TVSS/SPD) option.

Control Panel Functions

The PDR has one or two graphical Liquid Crystal Displays (LCDs) with backlight, four status LEDs, and five control buttons (see Figure 21). The display provides useful information about system events, measurements, and settings.

Depending on configuration, the PDR contains one or two Universal Control Boards (UCBs). With two UCBs, two displays are installed, one to monitor each UCB. With one UCB, one display is installed or (optionally) two displays provide identical information for the single installed UCB.

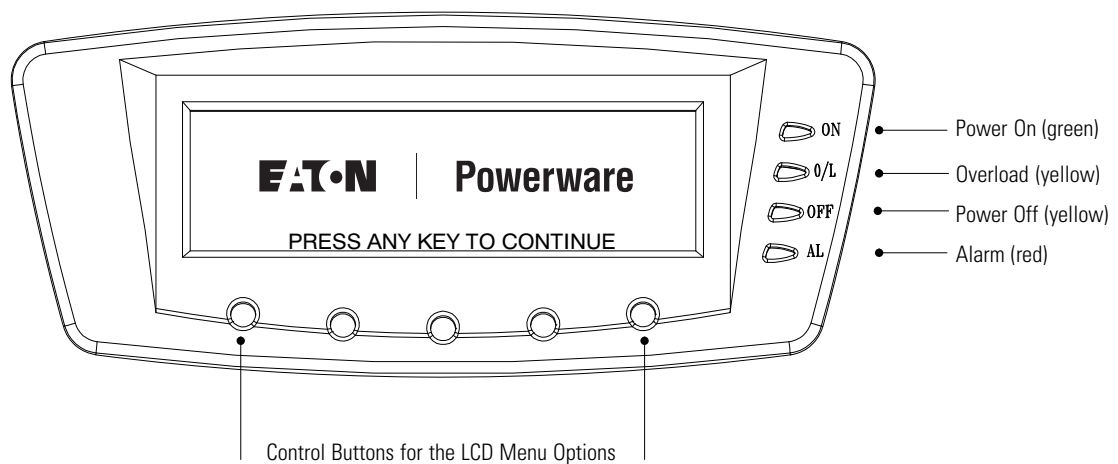


Figure 21. Energy Management System (EMS) Meter Display

Indicator	Status	Description
ON Green	On	The PDR is operating normally.
	Off	The PDR is turned off and will not turn on automatically.
O/L Yellow	On	One or more phases is in overload, or there is an alarm or warning for neutral overload, ground overload, main panel breaker overload, or panel breaker overload.
OFF Yellow	On	The PDR is de-energized or output voltage is less than 25% of nominal. Configurations with side breakers. The PDR has open or tripped main input breakers.
AL Red	Flashing	There is a new or cleared PDR alarm condition. See “Troubleshooting” on page 47 for additional information. To silence the horn, press any button.
	On	An acknowledged alarm condition exists.

EMS Meter Levels

The following table shows the EMS meter levels and their features.

Feature	System Level Monitoring	Branch Circuit Monitoring
System-level input and output meters	X	X
Active events	X	X
History log	X	X
Setup menu	X	X
Mimic screen	X	X
Profile log	X	X
Branch circuit monitoring		X

Display Functions

The LCD displays the Eaton Powerware logo. Press any button to activate the mimic screen and menu options (see Figure 22). The mimic screen shows a real-time graphical representation of the operating status of the system. At the top of the screen, an information line cycles through displays of the date and time, and any active alarms or events.

To select a menu option, press the button below the option label. When available:

- Use the ↑ and ↓ buttons to scroll through a listing of information.
- Use the ← and → buttons to select another item on the screen to view or change.
- Press the ↶ button to return to the previous menu.

The backlit LCD automatically dims after a long period of inactivity. Press any button to restore the screen.

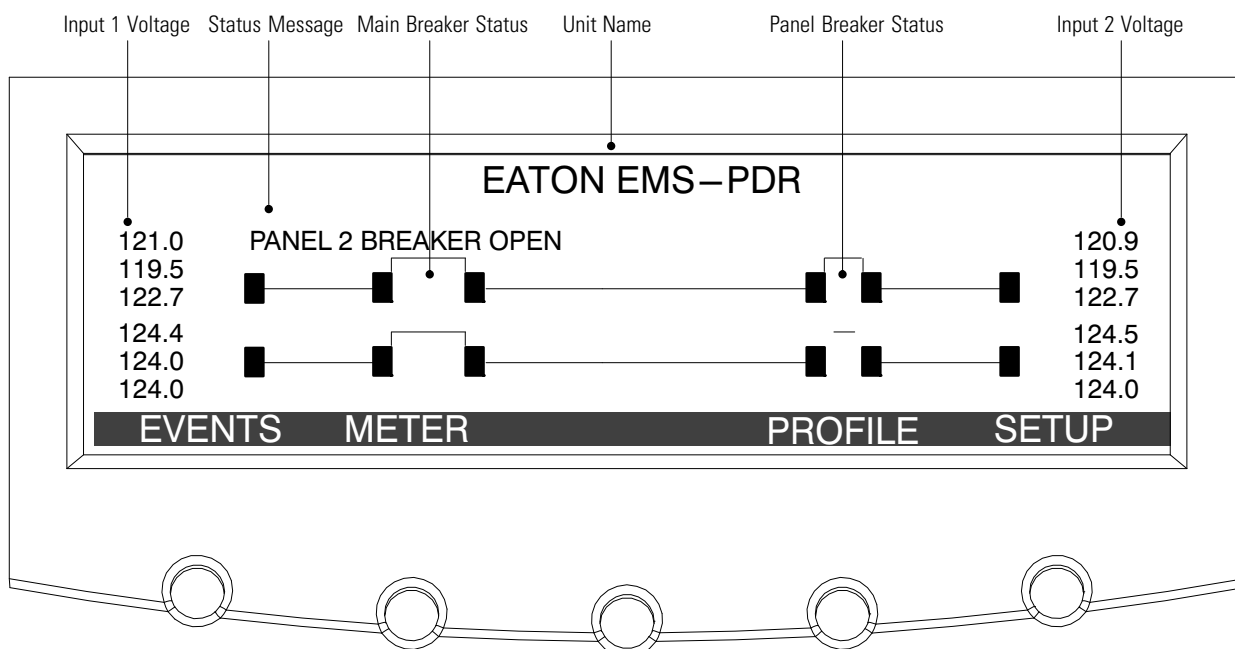


Figure 22. Mimic Screen and Main Menu (Dual 400A Main Input Breaker or Dual 600A Main Input Breaker Configuration Shown)



NOTE After making configuration changes, you can save your changes immediately by pressing the Reset button on the Power Xpert Gateway Card installed in the X-Slot communication bay (shown in Figure 1 on page 3). The card resets automatically after five minutes.

Menu Map

The following tables show the basic menu structure.

Table 6. Menu Map for Display Functions

Main Menu	Submenu	Display Information or Menu Function
Events	Active Events	Displays list of active system events. As events clear, they are removed from the list.
	History	Displays historical log of system events. The log stores the most recent 127 events and alarms.
Meter	Input 1	Displays Input 1 performance meters for the system or critical load (see Table 7 for detail): RMS / % / THD / Crest / KWH
	Input 2	Displays Input 2 performance meters for the system or critical load (see Table 7 for detail): RMS / % / THD / Crest / KWH
Profile		Displays load profile for the most recent 24 months. Profile includes highest and lowest input and output currents, frequencies, power levels, power factors, AC undervoltage, and THD, and exact time each reading occurred. Current month's profile reflects real-time values.
Setup		Displays setup options. See Table 8 for detail.

Table 7. Input 1 and Input 2 Meters

Screen	Meters Displayed
Input RMS (two screens)	Total input voltage line-to-line (V1–2, V2–3, V3–1) Total input voltage line-to-neutral (V1, V2, V3) Input current for each phase (I1, I2, I3) Input frequency (Hz) Input kVA (KVA) Input kW (KW) Input power factor (PF) Input neutral (In) Input ground (Ig)
Input %	Ratio (in percent) of present input voltage compared to nominal (V1, V2, V3, KW, I1, I2, I3)
Input THD	Ratio (in tenth percent) of the distortion present on the input in the form of harmonics and noise compared to fundamental pure sine wave (utility frequency) (V1, V2, V3, I1, I2, I3)
Input Crest	Ratio (in percent) of the peak to RMS of the input currents (I1, I2, I3)
Input KWH	Total power (KWH/m, KWH/y, KWHt)

Setup Options

Access to setup options is restricted to three System Setup Levels: 0, 1, or 2. The higher the level, the more setup options are available. Options on System Setup Level 0 do not require password access.

Table 8. Setup Options

Minimum Level*	Description	Available Settings	Default Setting
0	Enter Password	Use the arrow keys to enter the password for the level you want to access, then select DONE to display the options for the setup level.	Level 1: L1 Level 2: Contact your service representative
0	Versions	Read only	Current firmware versions installed
0	Contrast Adjust	Adjust screen contrast with left/right arrow buttons	10%
1	Log Out	Exit the Level 1 or Level 2 setup options and display the Level 0 setup options	None
1	Change Access Level Password	Change the password for the current setup level Use the arrow keys to enter the new password (A–Z, 0–9, –, blank), then select DONE to save the new password.	None
1	Set Date and Time	Set Month, Date, Year (mm/dd/yyyy) Set Hour, Minute (Time is a 24-hour clock.)	00/00/0000 00:00
1	Clear History	Clear the History Log	None
1	Clear Load Profile	Clear the Load Profile	None
1	THD Alarm Level	Set the voltage and current Total Harmonic Distortion for Input 1 and Input 2, and enable or disable this feature: THD settings Enabled/Disabled	5.0 Disabled
2	Unit Type	Read only: Model / CTO / Serial	Factory-set identifiers
2	Unit Name	Up to 20 characters (A–Z, 0–9, –, blank)	EATON EMS-PDR
2	Reset All lower Level Passwords	Reset the Level 1 password to the default setting	None

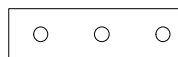
* Minimum System Setup Level required to access the setup option.

Surge Protection Option

The optional Transient Voltage Surge Suppression / Surge Protective Device (TVSS/SPD) has three status indicators (see Figure 23) visible through a slot near the bottom of the interior barrier protecting the panelboard. The PDR provides up to four TVSS/SPD devices, depending on configuration. For TVSS/SPD specification details, see Table 14 on page 44.



NOTE Phase status generated by the TVSS/SPD is communicated through the TVSS/SPD status indicators, not through the display.



POWER APPLIED TO PHASES
(green indicators illuminated)

Figure 23. TVSS/SPD Indicators

Initial Configuration

Perform the initial configuration according to your installed meter option.



NOTE *If two displays and two UCBs are installed, perform the initial configuration on each display. If two displays but only one UCB are installed, perform the initial configuration on either display (the displays are identical).*

EMS System Level Monitoring

It is recommended to set the following options:

- Date and time
- Screen contrast

To use the setup menu, see “Setup Options.”

EMS Branch Circuit Monitoring System

Perform the initial configuration for EMS System Level Monitoring. For instructions specific to BCMS, refer to the user’s guide for the EMS BCMS option.

Side Breaker Access



NOTE *Side breaker access is available only on configurations with side breakers.*

A locked access panel covers the side breakers.

To unlock and remove the side breaker access panel:

1. Locate the ten panel keys originally supplied in the accessory kit.
2. Slide a panel key into each horizontal panel lock on the access panel until the key is firmly in place.
3. Turn each key a quarter turn to unlock it. The key locks onto the access panel.
4. Grasp the top two keys and lift the access panel straight off the cabinet.
5. Place the access panel in a safe area away from the cabinet to prevent injury or damage to the PDR or personnel.

To replace and lock the side breaker access panel:

1. Grasp the two panel keys at the top of the access panel and place the access panel on the side panel, inserting the access panel lock pins into the square holes on the side panel.
2. Turn each key a quarter turn to lock it, and remove the key.
3. Place the panel keys in a safe area.

Startup and Shutdown

Startup

To start the PDR:

1. Verify that all circuit breakers are in the OFF position.
2. Turn on utility power to the PDR.
3. **Configurations with side breakers.** Turn the main input circuit breaker(s) to the ON position. To access the side breakers, see "Side Breaker Access."
4. Verify that the display activates after approximately 30 seconds, indicating logic power. If two displays are installed, verify that both activate.
5. Turn the panelboard circuit breakers to the ON position.
6. Verify that the Off and Alarm indicators are off and the On indicator is illuminated.
7. Turn the panelboard main breakers to the ON position.
8. Turn the individual branch circuit breakers to the ON position following the startup sequence recommended by the load equipment manufacturer.

Shutdown

To shut down the PDR:

1. Shut down the load equipment according to the manufacturer's recommended shutdown sequence.

Load equipment may be turned off at the equipment or at the circuit breakers on the PDR.

2. Turn all the panelboard circuit breakers to the OFF position.
3. **Configurations with side breakers.** Turn the main input circuit breaker(s) to the OFF position. To access the side breakers, see "Side Breaker Access."
4. To remove power from the PDR completely, disconnect the main input(s) at the source.

Chapter 5

Maintenance

This section explains how to:

- Perform preventive maintenance and firmware updates for the PDR
- Store the PDR
- Recycle the PDR

Important Safety Instructions

The PDR interior is unsafe until AC source power is removed.



WARNING

- Servicing and maintenance should be performed by qualified service personnel only.
- **LETHAL VOLTAGE PRESENT.** This unit should not be operated with the cabinet doors open or safety panels removed. Do not make any assumptions about the electrical state of the PDR.

Preventive Maintenance

The PDR requires very little preventive maintenance. However, the system should be inspected periodically to verify that the unit is operating normally.

DAILY Maintenance

Perform the following steps daily:

1. Keep the area around the PDR clean and dust-free. If the atmosphere is very dusty, clean the outside of the system with a vacuum cleaner.
2. Verify that none of the ventilation accesses are blocked.
3. Verify that the operating environment is within the parameters specified in Table 13 on page 44.
4. Record the check results and any corrective actions in a suitable log.

PERIODIC Maintenance

Inspect the PDR periodically to determine if components, wiring, and connections exhibit evidence of overheating or other damage. Give particular attention to bolted connections. Retorque the bolted connections as needed to their appropriate values.

Refer to the distribution panel manufacturer's circuit breaker application and maintenance literature for recommended maintenance practices and procedures.

ANNUAL Maintenance

Annual preventive maintenance, if required, should be performed only by authorized service personnel familiar with maintenance and servicing of the PDR. Contact your service representative for more information about service offerings.

Updating the Firmware

For firmware updates, contact your service representative. See “Service and Support” on page 47.

Short Circuits

Short circuits are not considered normal phenomena in PDR system applications. Tripping of protective devices due to low impedance short circuits should be thoroughly investigated for damage to conductors, insulation, and the protective devices in accordance with the manufacturer’s recommendations.

Storage

If you store the PDR for any period, store it with its protective packaging material in place. Protect the stored equipment at all times from excessive moisture, dirt, corrosive conditions, and other contaminants. See Table 13 on page 44 for environmental specifications.

Do not store the PDR outdoors or stack other equipment on top of the PDR, whether packaged or not. Do not place the PDR on its side.

Recycling the Used PDR

Contact your local recycling or hazardous waste center for information on proper disposal of the used PDR.



CAUTION

Do not discard the PDR in the trash. This product must be disposed of properly. For more information, contact your local recycling/reuse or hazardous waste center.



CAUTION

Do not discard waste electrical or electronic equipment (WEEE) in the trash. For proper disposal, contact your local recycling/reuse or hazardous waste center.

Chapter 6

Specifications

This chapter provides product specifications and configuration schematics.

Product Specifications

This section provides the following specifications for the PDR:

- Weights and dimensions
- Electrical input and output
- Meter
- Environmental and safety
- Transient Voltage Surge Suppression / Surge Protective Device (TVSS/SPD)

Table 9. Weights and Dimensions

Dimensions (WxDxH)	597 x 965 x 1994 mm (23.5" x 38" x 78.5")
Weight	One Side: 200 kg (450 lb) Two Sides: 315 kg (700 lb) NOTE: Weights are approximate. Weight varies depending on installed options.
Maximum Distributed Weight	1225 kg/sq m (250 lb/sq ft)

Table 10. Electrical Input

Nominal Input Voltage	208/120 Vac three-phase, 3 wire + N + G
Nominal Input Frequency	50 or 60 Hz
Input Frequency Range	45–65 Hz
Input Ratings	Up to 1280A depending on configuration
Connections	Direct connection to panelboard circuit breakers (quad-feed) Main incoming lugs Main breakers NOTE: Power terminals provide connection of a 173% rated neutral and a parity-sized insulated ground.
Input Power Factor	Load dependent
Input Current THD	Load dependent

Table 11. Electrical Output

Nominal Output Voltage	208/120 Vac three-phase, 3 wire + N + G
Nominal Output Frequency	50 or 60 Hz
Output Frequency Range	45–65 Hz

Table 12. EMS Meter

Calibration	Fully calibrated at the factory
Clock	Real Time Clock (RTC) with one-second resolution, automatic leap year adjustment, and one month backup time
Display	Backlit LCD panel with 8 lines by 40 characters (approximately 64 × 240 pixels), 4 LED indicators, and 5 pushbuttons

Table 13. Environmental and Safety

Enclosure	Freestanding NEMA type 1 enclosure (42U) with (4) heavy-duty swivel casters and (4) permanent leveling feet Meets IP10 requirements Up to 168 pluggable cable/conduit openings
Cooling	Convection cooling, with perforations and openings for ventilation
Operating Temperature	0°C to 40°C (32°F to 104°F)
Storage Temperature	-55°C to 85°C (-67°F to 185°F)
Relative Humidity	5–95% noncondensing
Operating Altitude	Up to 3,050 meters (10,000 ft) above sea level with no derating Higher altitude applications may require derating.
Storage/Transport Altitude	Up to 12,200 meters (40,000 ft) above sea level
Audible Noise	Less than 45 dBA at 1.5m (5 ft) under normal operating conditions
Agency Markings	UL, cUL, NOM
Safety Conformance	UL/CSA 60950-1, UL 891
EMC (Class A)	FCC 47 Part 15
Electrostatic Discharge (ESD) Immunity	Meets IEC 61000-4-2 specifications Withstands up to 8 kV pulse without damage and with no adverse effect to the critical load

Table 14. TVSS/SPD (Optional)

Platform	Hybrid designed, individually fused, MOV surge suppressor providing equal impedance paths to each matched MOV
Capacity	50/100 kA/phase (208V or 400V) based on a standard 8 × 20 microsec waveform
Indicators	Green indicator lights for each phase protected
Noise Attenuation	40 dB at 100 kHz
Safety Conformance	UL 1449 2nd Ed, UL 1283 and CSA 22.2, ANSI/IEEE C62.41, ANSI/IEEE C62.45-1992

Configuration Schematics

The following figures show high-level schematics for each configuration.

Options shown include up to two sides, up to two Universal Control Boards (UCBs) with up to two displays, and up to four Transient Voltage Surge Suppression / Surge Protective Devices (TVSS/SPDs), depending on configuration.

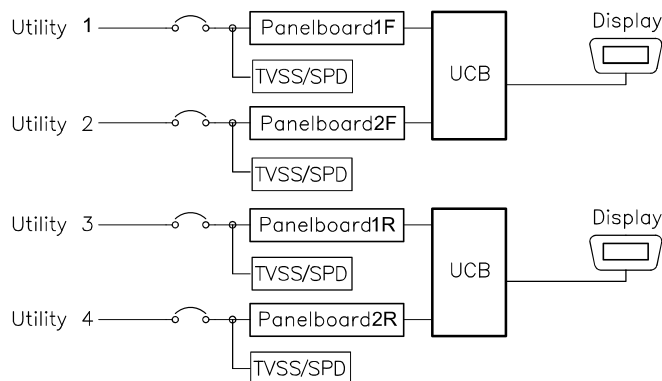


Figure 24. Quad-Feed Input Configuration Schematic (Options Shown)

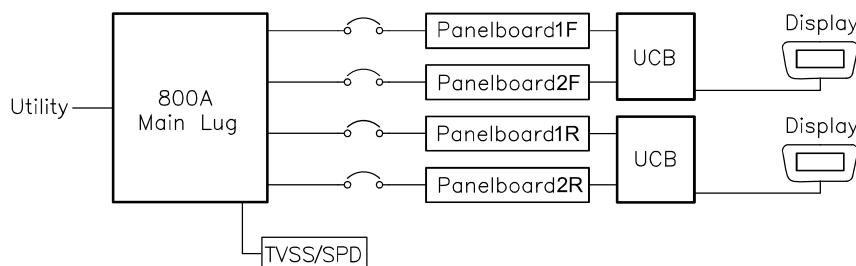


Figure 25. Single 800A Main Input Lug Configuration (Options Shown)

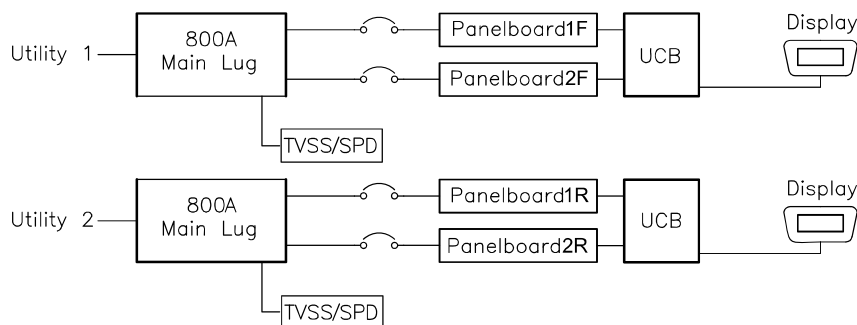


Figure 26. Dual 800A Main Input Lug Configuration (Options Shown)

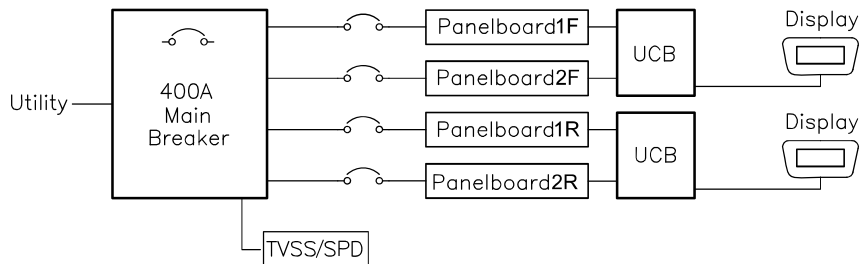


Figure 27. Single 400A Main Input Breaker Configuration (Options Shown)

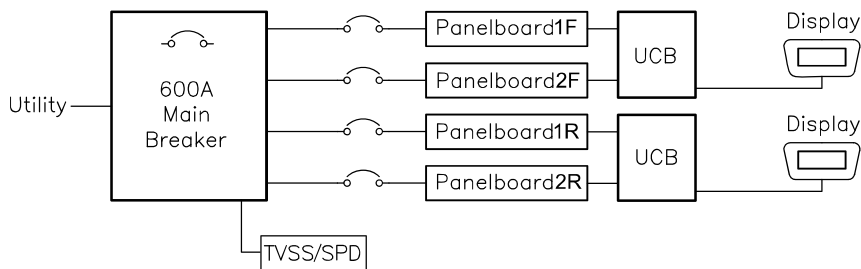


Figure 28. Single 600A Main Input Breaker Configuration (Options Shown)

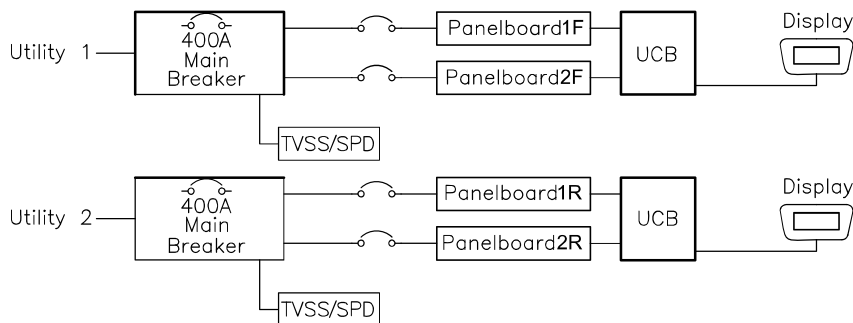


Figure 29. Dual 400A Main Input Breaker Configuration (Options Shown)

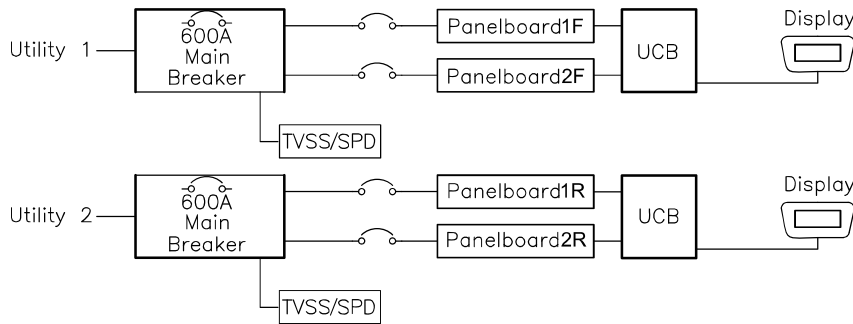


Figure 30. Dual 600A Main Input Breaker Configuration (Options Shown)

Chapter 7

Troubleshooting

Alarms and Conditions

To view the active alarms or alarm history, select EVENTS on the display, then ACTIVE EVENTS or HISTORY.

For further help, please contact the Help Desk.

Service and Support

If you have any questions or problems with the PDR, call your **Local Distributor** or the **Help Desk** at one of the following telephone numbers and ask for an PDR technical representative.

United States: **1-800-843-9433** or **1-919-870-3028**
Canada: **1-800-461-9166 ext 260**
All other countries: **Call your local service representative**

Please have the following information ready when you call for service:

- Model number
- Serial number
- Firmware version number
- Date of failure or problem
- Symptoms of failure or problem
- Customer return address and contact information

If repair is required, you will be given a Returned Material Authorization (RMA) Number. This number must appear on the outside of the package and on the Bill Of Lading (if applicable). Use the original packaging or request packaging from the Help Desk or distributor. Units damaged in shipment as a result of improper packaging are not covered under warranty. A replacement or repair unit will be shipped, freight prepaid for all warrantied units.



NOTE For critical applications, immediate replacement may be available. Call the **Help Desk** for the dealer or distributor nearest you.

Chapter 8

Warranty

LIMITED FACTORY WARRANTY FOR THREE-PHASE EATON POWER DISTRIBUTION RACK (PDR) AND REMOTE POWER PANEL (RPP) PRODUCTS

WARRANTOR: The warrantor for the limited warranties set forth herein is Eaton Corporation, a Delaware Corporation (“Eaton”).

LIMITED WARRANTY: This limited warranty (this “Warranty”) applies only to the original end-user (the “End-User”) of the Eaton Three-Phase PDR and RPP Products (the “Product”) and cannot be transferred. This Warranty applies even in the event that the Product is initially sold by Eaton for resale to an End-User.

LIMITED WARRANTY PERIOD: The period covered by this Warranty for Product installed [and currently located] in the fifty (50) United States and the District of Columbia is twelve (12) months from the date of Product startup or eighteen (18) months from the date of Product shipment, whichever occurs first, for parts coverage and 90 days from the date of Product startup for labor coverage. The period covered by this Warranty for Product installed [and currently located] outside of the fifty (50) United States and the District of Columbia is twelve (12) months from the date of Product startup or eighteen (18) months from the date of Product shipment, whichever occurs first, for parts coverage.

WHAT THIS LIMITED WARRANTY COVERS: The warrantor warrants that the Eaton three-phase Product electronics and Eaton-provided accessories (individually and collectively, the “Warranted Items”) are free from defects in material and workmanship. If, in the opinion of Eaton, a Warranted Item is defective and the defect is within the terms of this Warranty, Eaton’s sole obligation will be to repair or replace such defective item (including by providing service, parts, and labor, as applicable), at the option of Eaton. The Warranted Item will be repaired or replaced onsite at the End-User’s location or such other location as determined by Eaton. Any parts that are replaced may be new or reconditioned. All parts replaced by Eaton shall become the property of Eaton.

WHAT THIS LIMITED WARRANTY DOES NOT COVER: This Warranty does not cover any defects or damages caused by: (a) failure to properly store the Product before installation; (b) shipping and delivery of the Product if shipping is FOB Factory; (c) neglect, accident, fire, flood, lightning, vandalism, acts of God, Customer’s neglect, abuse, misuse, misapplication, incorrect installation; (d) repair or alteration not authorized in writing by Eaton personnel or performed by an authorized Eaton Customer Service Engineer or Agent; or (e) improper testing, operation, maintenance, adjustment, or any modification of any kind not authorized in writing by Eaton personnel or performed by an authorized Eaton Customer Service Engineer or Agent.

This Warranty is not valid: (a) if the Product is moved to a new location by someone other than an authorized Eaton Customer Service Engineer (in the USA) or Agent (outside of the USA); or (b) if the Product’s serial numbers have been removed or are illegible. Any Warranted Items repaired or replaced pursuant to this Warranty will be warranted for the remaining portion of the original Warranty subject to all the terms thereof. Labor warranty is not provided for Product located outside of the fifty (50) United States or the District of Columbia. **Any equipment, parts, or materials included in the Product and not manufactured by Eaton are warranted solely by the manufacturer of such equipment, parts, or materials and are not included as part of this Warranty.**

THIS WARRANTY IS THE END-USER’S SOLE REMEDY AND IS EXPRESSLY IN LIEU OF, AND THERE ARE NO OTHER EXPRESSED OR IMPLIED GUARANTEES OR WARRANTIES (INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PURPOSE, WHICH ARE EXPRESSLY DISCLAIMED).

LIMITATION OF LIABILITY: In no event shall Eaton be liable for any indirect, incidental, special, or consequential damages of any kind or type whatsoever, or based on any claim or cause of action, however denominated. Eaton shall not be responsible for failure to provide service or parts due to causes beyond Eaton’s reasonable control. In no case will Eaton’s liability under this Warranty exceed the replacement value of the Warranted Items.

END-USER’S OBLIGATIONS: In order to receive the benefits of this Warranty, the End-User must use the Product in a normal way, follow the Product’s user’s guide, and protect against further damage to the Product if there is a covered defect.

OTHER LIMITATIONS: Eaton’s obligations under this Warranty are expressly conditioned upon receipt by Eaton of all payments due to it (including interest charges, if any). During such time as Eaton has not received payment of any amount due to it for the Product, in accordance with the contract terms under which the Product is sold, Eaton shall have no obligation under this Warranty. Also during such time, the period of this Warranty shall continue to run and the expiration of this Warranty shall not be extended upon payment of any overdue or unpaid amounts.

COSTS NOT RELATED TO WARRANTY: The End-User shall be invoiced for, and shall pay for, all services not expressly provided for by the terms of this Warranty, including without limitation site calls involving an inspection that determines no corrective maintenance is required. Any costs for replacement equipment, installation, materials, freight charges, travel expenses, or labor of Eaton representatives outside the terms of this Warranty will be borne by the End-User.

OBTAINING WARRANTY SERVICE: In the USA, call the Eaton Customer Reliability Center 7x24 at 800-843-9433. Outside of the USA, call your local Eaton sales or service representative, or call the Eaton Customer Reliability Center in the USA at 919-870-3028. For comments or questions about this Limited Factory Warranty, write to the Customer Quality Representative, 3301 Spring Forest Road, Raleigh, North Carolina 27616 USA.



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